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THE
DENTAL COSMOS:

A
MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

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Observe, Compare, Reflect, Record.

VOL. VI.

PHILADELPHIA:
SAMUEL S. WHITE, PUBLISHER,
528 ARCH STREET.
1865.



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THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, AUGUST, 1864.

No. 1.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

ENOUGH has been said to caution, as well as instruct a young practitioner, in regard to plugging teeth when nerve exposure is doubtful. So nothing remains but to consider those cases of plugging where the pulps *are* dead when the patients apply for advice. There is nothing so deceptive as such teeth; they appear to be perfectly free from the liability to pain, they seem to be in a *torpid* state and unimpressible; but woe to the patient if he submits himself to the ignoramus: the least touch may be like the match to powder. We will suppose a patient presents himself to get a tooth plugged, and it is found that the pulp is dead, and, perhaps, has been for a long time. We cleanse the cavity and the root as well as we can, washing them out with cold water, and then fill the root with cotton steeped in creosote, placing, in the outer cavity, simple cotton, and send the patient away, advising him to call in two or three days, providing there is no pain following our treatment. If the case becomes painful, the patient will return at once, and the cotton will be removed, and the root washed out with cold water, and only the outside cavity filled with cotton. In all probability the case may recover, and as soon as it does, wedge it again with creosote and cotton. Repeat this dressing every few days, and if there is no discharge from the root or soreness, the tooth may be plugged. Perhaps there may be considerable discharge from the root, and under such circumstances the root must be *mopped* out every day, or every two days. This can be done by fastening a small portion of damp cotton on the end of a nerve probe, passing it up and down the root as if you were swabbing out a gun-barrel, continuing the operation until the cotton ceases to be discolored; then renew the creosote, and when it remains one or two days without becoming discolored,

it is fair to presume that the case is fit for plugging. We have had such cases under treatment for months, and finally succeeded with them.

Suppose a patient calls to get a pivot tooth set, and the pulp has been dead for a long time. In such a case we drill the root and wedge it with creosote and cotton, and file the root a very little, and see the patient in a few days. If no soreness supervenes, we can do a little more than we did the first sitting. Perhaps we can put on a tooth temporarily, and when we are sure there is no liability to pain, we place on a permanent tooth and pivot. Now, why all this care? We answer, to avoid pain and injury to the root. If a case of the kind can be handled without rousing up disease of the root, it may do well for years. A root in which the pulp is dead, is like a hollow tube set in the alveolus, and it is made up of innumerable capillary tubes running transversely, commencing on the walls of the pulp canal, and terminating in the cementum, and it unites with the membrane covering the root, which is highly vascular. This membrane keeps up the life of the root for an indefinite time, but is always in a morbid condition, and susceptible to irritation and inflammation from the slightest exciting cause; hence the jar of the file and the drill is so liable to produce mischief. Besides, it is a kind of drain to the outer membrane; the capillary tubes are absorbing the fluids of the blood at all times, and pouring them into the main canal like a ditch drains a bog. This current must be turned back by slow degrees without exciting inflammation, until the operation of setting or plugging is over, and the cure is left to nature. Thus we may *prevent* toothache.

(To be continued.)

FACIAL NEURALGIA.

BY WM. H. ATKINSON, M.D.

Read before the New York Society of Dental Surgeons.

To comprehend the diseases of the facial nerve, it is necessary that we apprehend the nutrition generic to the nervous system.

Inasmuch as we can cognize pain only through the neural tracts, or vicariously through deranged condensed cellular tissue transmitting impressions to the sentient seat, it may be queried whether indeed all pain is not more or less correctly denominated neuralgia.

Terms are invented to convey, not to obscure knowledge; and yet close scrutiny will scarcely enable us to determine which end they most efficiently subserve.

Pain, unaccompanied with cognizable inflammatory process, is usually set down as neuralgic, and yet there is no pain possible without the presence of that which may be the inception of unmistakable inflammation; therefore neuralgia may be said to be pain produced by dynamic or occult cause—lesion of nerve aura—disagreement between ghost and body.

This always occurs in loss of balance of nutrient activity; ease being the sequence of harmony or balance—*dis-ease* the sequent of inharmony of the nutrient flow.

This would seem to indicate that health is merely the absence of disease, and that absence of pain would indicate health.

But this will not do by any means to assert as true doctrine. Isolated and exclusive statements can at best but convey aspectual views of function, which must be rounded up and completed, to enable us to comprehend the true meaning of pain, pleasure, ease, and disease, all of which may have degrees of presence short of their absolute and individual expression or pronouncement, all being but results of relational conditions. It will not do to invoke concomitant states as causes by which to explain results. This has been done to the great hinderance of progress in chemical, physiological, and pathological investigations.

There is usually a train or series of causes necessary to the production of pain, which would be absent or much modified by ellipsing any one of them.

Fluidity of neural and vascular blood is a prime condition to continuance of the functions of the animal body, and therefore certain temperatures contribute to induce or disperse neuralgias. Hence moist climates or moist weather will contribute to the prevalence of neuralgic affections, because of the tendency to irradiate the animal heat under such circumstances.

Neuralgias and kindred diseases are not prevalent in dry, warm countries, seasons, and localities. This admonishes us to wear non-conductors as clothing next to the skin, that we may conserve the animal heat and consequent vigor and ease of the neural and vascular circulations.

Exhaustive drains upon the circulation are prolific sources of neuralgias. Over-feeding upon foods rich in proteinaceous elements, unaccompanied with vigorous activity, tends to thicken and render sluggish the neural and vascular bloods by which neuralgias, rheumatisms, etc. are induced.

Were the exact balance of supply and waste once attained and fully apprehended, we should have the standard up to which to work to insure us against all forms of disease; and then we should only need to have unlimited access to foods and other conditions of living to secure us perpetuity of being in the blissful state, one of whose derangements we are now considering, in the loss of polar balance between the diastolic and systolic actions of the entire system and all its complications of machinery and parts, from which arises such intense agony. But this attainment involves such depth of understanding, of not only physics but also metaphysics, that we may not hope to inaugurate a standard of health quite above the possibility of disease until many shall have learned obedience to the laws of life through suffering, not only the pains of disease, but

also the severity of the processes through which it is necessary to pass to remove the disease and re-establish health.

All pain is the result of derangement of nerve aura *per se*, or from impressions upon the sea of nerve aura, through injury of other tissues not normally endowed with the power of transmitting sensation to the sentient seat or mind of the ghost.

In fact, in just so far as they assume the power to transmit sensation they do it by tendency to solution, thus simulating (and actually in so far being) nerve mass, through which the sentiency courses, after the manner of electric or galvanic currents, in receiving and transmitting matters cognizable by the mind.

That which is meant by "sea of nerve aura" is the "nerve blood," or that colorless fluid that penetrates and pervades all the tissues communicating and mixing with the "liquor sanguinis" of writers.

When "liquor sanguinis" alone is extravasated, causing swelling, there is no "tenderness" of the part; but where "nerve blood" is also wept out, helping to increase the volume of the swelling, there will be some "tenderness;" and when the exudate is principally "nerve blood," the "tenderness" is acute and distressing.

This explains why swelling mitigates the pain of irritation in incipient abscesses when accompanied by general inflammation; and why it is so acute in neuromatic swellings and those attending neuralgic affections.

Local puncture and depletion promptly cure the former, while it only complicates and aggravates the latter.

Where nerve mass becomes a little further organized beyond its mucoid state, it becomes neurine; and when fully organized it is neurilemma, very nearly like other forms of condensed cellular tissue.

As all the tissues must be renovated by supplies through chyle, and as chyle is but mucous mass—nerve mass—it is evident that the sea of nerve aura must be the least organized of all the fluids or solids of the body, and hence most amenable to be acted upon by the (so-called imponderables) life-forces no less than mechanical violences.

Instance the intensity of suffering of those affected with neuralgia when acted upon by mental, sonorous, or mechanical impulsions!

That all pain or pleasure or modifications of these originates and ultimately in motion, which produces emotion, I presume will not be denied by any. But what motion itself is, and what are the laws by which it is governed, and the relations necessary to cognize its presence, is not so easy of assertion or denial.

Neuralgia is the cognizance of a particular kind and degree of motion which will be the parent of *e*-motions, whose character will be in accordance with the mental and moral state at the time.

As is well known, inflictions of violence are sources of pain or pleasure, in accordance with the supposed intent of those inflicting them. Instance:

we receive a clip upon a sensitive part, and, thinking it to have been wantonly done by an adult or person of discretion, it gives us real pain and suffering, until, upon turning about, we discover that it was a pet child or dear friend, who had only hit us a love-pat—and lo! the pain and suffering vanish with the better state of mind! This proves that it is the sentiency and not the body that suffers.

This, then, being the case, what is the best we can do to prevent and cure neuralgias?

Answer.—Beyond all doubt, the best possible means is to inform the mind upon the laws of organization, and thus awaken it to the necessity of preventing inception of diseased states when it is possible, and where it is not, to mitigate, by correct understanding of the manner and means of cure, which of itself is more than half accomplished when we shall have gotten control of the dreadful apprehensions that seize the uninformed mind, so soon as subjected to suffering, as the penalty of infracted law, of which they have but vague conceptions.

As “open vision,” then, is necessary to antidote the pains already incorporated within us, let us also seek it, as a sure means of avoiding the distressing consequences of want of sight; let us seek to walk in the light, that we stumble not.

NEW YORK, April 30, 1864.

TEMPERAMENT.—No. 2.

BY WM. H. ATKINSON.

Read before the New York Society of Dental Surgeons.

THE modifications of temperament being dependent upon—first, the character of the primates or elements of spirit, soul, and body, (whose conjoined activity produces individual mind,) and second, the changes wrought in these primates by tension, wear, or other act of combination and separation in the focalization of the sentiency denominated segregate consciousness, it becomes important that we understand the affinities which render the recuperative or nutrient pabulum benign or noxious, as this is the foundation upon which health or disease, both spiritual and physical, is built and developed. The uninterrupted flow of benign influences tending to health and life—cohesion of primates; the noxious, to disease and death—separation of primates.

Disease, then, can be no less than a minor death, and health can be nothing short of the fullest expression of life of which the personality is capable.

Thus compatibility or incompatibility of primates in original conformation of the being or in the foods, spiritual and corporeal, which nourish it, constitutes the very threshold over which life or death passes to assume the control of the body. Then if compatibility among the primates of

molecules renders them harmonious and vigorous, it is easy of apprehension that the body of which they are composed will also be well developed and strong when supplied with the like compatibility in a well selected and abundant food.

So our first means of learning the law is afforded us in the results of its infraction.

Having as yet had no example of perfect health on the planet, we are at a loss to prove practically what its manifestations are. We have denominated a less degree of disease by this salubrious epithet, because we compare it with the system, with life-endowment barely sufficient for existence; so that our nomenclature here, as elsewhere, proves that conditions of life-manifestation differ but in degree in all save the infinite source of the principle, which interpenetrates and causes the various modifications of spiritual, mental, and corporeal life which, in turn, are but modifications of the ONE! So that life never can be extinct, in the true sense, only so far as it relates to corporeal primates in their segregate expression, whose solution is death to them, but freedom only to the life which vivified them.

Admixture of the proximates of bodies constituting them defines the character in kind and degree, both as to size and temperament.

And, as we can have no body complex in its nature short of the exercise of creative, procreative, and developmental power, we should look well to the laws of reproduction, as indices determinate of temperament.

There can be no reproduction of a body in kind short of maturity of its own essential parts, or until it shall have acquired elemental primates beyond complete saturation of its own organs in their individual need; at which time, if food be abundant, some of its cells, or organs, as the case may be, take up the rich solution of the primates of the whole being, derived from the excess of food, and correlates it into germs or buds capable of development into new beings in kind, under the proper enabling circumstances to favor the evolution.

The essential genesis of new being involves the preparation of a negative germ, into which the positive light or life flows to vivify it and enable it to pass the alternate stages of solidification and solution, (oxidation and deoxidation,) oft repeated in the processes denominated nutrition, development, and growth, until it, in turn, attains its own maturity and is ready to repeat the same rôle of actions which produced it.

Just what is meant by kind or sort in general is difficult of clear and precise definition! Reproductions by gemmation, a simple budding or fission of the parent into minute portions, is only seen in what are called very low and simple bodies, whose fragment answers to a vivified germ or seed, out of which a considerable diversity of beings is produced; but the difference only expresses variety in the same kind (species, genera, family, order, etc.) sufficient to constitute individuals, and keep them from

flowing together and becoming one singular of the dimensions in bulk equal to all the differentiated singulars.

In low bodies, where life is well pronounced, these, plus (+) and minus (—), charged parts in the same individual lay the foundations of sex in diverse individualities, when complications of organic primates shall have accumulated to the degree of completeness to favor negative and positive entities with separate bodies and separate volitions, because of the ever-varying polarity of molecules, of which they are constituted; thus establishing affinity or mutual need for the presence of each to the other, to constitute satisfaction, felicity, or contentment with the state, be it positive or negative, in the mutual impartation of what each has to spare to complete the life and well-being of the other.

Out of this relation of expenditure of forces grows an increased ability to aggregate the primates of being to the individual organism, which becomes at once, upon entrance into the blood column, stamped with the positive (male) or negative (female) character of the organism into which they enter, constituting semen and ovum, which tend in the degree of accumulation to divinize their possessors and enable them to perform the god-like act of creating new beings within the limits of organic relation. What these limits are it requires intimate acquaintance with physiophilosophy to determine and express. And, until these are comprehended, we shall not fully appreciate the primates, whose blendings produce the conditions denominated temperaments or diatheses.

How admixtures behave and what they produce can only be known upon actual experiment. This necessitates our travel and research among the primates of the three kingdoms of nature.

The simplest division among seen bodies may be said to be solids and fluids. Let oxygen represent the basal of all fluids and carbon that of solids. Out of the positings of these, through the influence of light, result all organic bodies pertaining to the earth sphere. Hence man may be said to be the embodiment or impersonation of all the possible mutations and aggregations of the positings of these two, under the guiding influence of the third. Therefore, in the language of another, "Man is but oxidized mucus." Let us now inquire what mucus is? Oken says it is "oxidized hydrated carbon," and "is the universality of the minerals and elements or the synthesis of earth, salt inflammable, and ore in water and air." Water and air themselves being but positings of the C and the O, effected by the influx or movement of the differencing light and its negative or indifferencing absence of light, darkness; the most differenced or deoxidized becoming metals, or, so to speak, dead bodies; the most intimately blended or oxidized producing living bodies of highest combinations, and all between bodies of intermediate endowments of life and activity.

Incongruities of admixture express themselves in the dermal or periph-

eric and the ophthalmic or light centres. And hence incompatibles, physiologically, if fruitful at all, generate a scrofulous offspring, whose skin, glands, and eyes are defective in the degree of want of balance in organic affinities in the mucus from which evolved, nourished, and developed.

Thus, from incongruity of the marriage relation, we may certainly date not only unhappy temperaments but diatheses, out of which they are sure to grow, if the degenerating tendencies are not promptly eradicated from the individual and society.

The principal diatheses or tendencies to diseased organisms may be said to show themselves in—1, Scrofula; 2, Scorbutus; 3, Rheumatism and Gout; 4, Cancer; and 5, the tendency to form calculous or lime deposits in the several tissues of the body. All of which are best understood by a close study of the evolution of the organic primates upon the plan hinted at in this paper.

NEW YORK, Oct. 8, 1863.

NITROUS OXIDE AN ANAESTHETIC.

BY G. Q. COLTON.

I NOTICE in the June number of the DENTAL COSMOS, an article from Dr. C. W. Foster, under the title of "*Nitrous Oxide not an Anæsthetic*," in which he says: "When I say nitrous oxide is not an anæsthetic, *per se*, I mean strictly what I say; that without the narcotizing power of carbonic acid gas, which is exhaled and confined in the bag, and is rebreathed again and again in ever-increasing proportions, *its present effects would not be producible*." No writer on science ever made a greater blunder. Let a person breathe from a one hundred-gallon bag of nitrous oxide, and anæsthesia will be produced in *much less time* than by breathing from a six-gallon bag. It cannot be said that in this case the effect is produced by carbonic acid gas. How, then, does Dr. Foster, upon his theory, account for the anæsthesia? *I state this as a fact*—any dentist who makes the gas can test the truth of it. I am aware that carbonic acid gas, mixed with atmospheric air, or with nitrous oxide, will produce anæsthesia, but patients will complain, after inhaling it, of weakness or headache; and so will they complain if they breathe from too small a dose of nitrous oxide. No such bad effects follow the inhalation of pure nitrous oxide, *if breathed from a large bag, say six or eight gallons*. The anæsthetic state is induced long before the oxygen is taken up. The presence of a small quantity of carbonic acid (there is never more than two or three per cent.) produces no injury, provided there is an excess of oxygen. Many dentists who use the gas, make a grand mistake in allowing patients to breathe from too small a dose; from a three or four gallon bag. They should never use less than a six-gallon bag, except with children, and with an aperture of full half an inch.

And now, as to the safety of the gas as an anæsthetic. I have given it every day (Sundays excepted) for the past fourteen months, to from six to twelve patients per day, extracting for each from one to twenty-one teeth and stumps. I have never failed in a single instance to produce anæsthesia or sleep. I have never had a patient attacked with convulsions. I have never had a patient so unpleasantly affected with the gas as to desire to lie down after inhaling it. On the contrary, within ten or fifteen minutes, they would walk from the office apparently as well as when they came. Is not this an unanswerable proof that the nitrous oxide is *safe*, and infinitely better than chloroform or ether? Can any dentist who has used these last anæsthetics produce such a record?

There are several important matters, though seemingly of small account, which should be attended to by those who use the gas, viz., the gas should be pure; it should be breathed from a full six-gallon bag, and within forty-eight hours after making; the patient should thoroughly exhaust the lungs of common air before commencing, and last, though not least, the dentist should explain to patients the sensations they will experience. I say to my patients, "You will think at first that you are breathing only common air; very soon you will experience a whizzing in the head, and you will then fear that I shall think you are asleep, and commence drawing your teeth. You need have no fear of that kind. I shall know when you are asleep." This explanation gives confidence to patients, *especially when they are breathing the gas*, and prevents them from becoming frightened. The operator can extract from four to ten teeth by one dose, according to age and temperament, or location of the teeth. As the patient is waking, say to him, "*All right, all right; your teeth are out!*" This arrests the attention, and reminds him at once of where he is, and what has been done. There is nothing like having the patient feel safe in your hands, and that he experiences only what you expected.

I pass over Dr. Foster's personalities respecting myself, as "Colton of gas notoriety," by reminding him that *anæsthesia*, which has conferred such blessings on mankind, was discovered *at and in consequence* of one of my "exhibitions" of the nitrous oxide gas in the City of Hartford, in 1844, (I do not claim to have originated the idea,) which is fully detailed in the report made by the Medical Society of the State of New York to the legislature of 1860; also by the late numbers of *The Medical and Surgical Reporter* of Philadelphia. I claim that after making and administering this gas for the past twenty years, having breathed at least three hundred doses myself within a year and a half past, I ought to know *something* as to its value and safety. If a writer in *The Dental Review* (see the July number of the DENTAL COSMOS) gives "*two gallons of nitrous oxide gas*" to a patient "nineteen years of age," and

expects to produce anæsthesia, and *fails*, it is no fault of the gas. This quantity is not sufficient to produce even a state of exhilaration. I should as soon expect to produce anæsthesia by a bag of common air.

Dr. Foster says: "That it cannot support respiration or life but a few moments, is seen in that frightful gasping of the patient, growing deeper and faster, *as he dies for want of air.*" These symptoms never attend the operation where the quantity *breathed from* is large enough. They would attend the breathing from a small bag of common air, as also from two small a dose of nitrous oxide. The gasping is due to the lack of oxygen; there being too small a quantity of gas, the oxygen is taken up before anæsthesia is induced. Let Dr. Foster use a six or (in some cases) an eight gallon bag, and there will be no "gasping" by his patients. The "gasping" is for oxygen, which a *large* dose of the gas supplies. When I first commenced the anæsthetic use of the gas, I occasionally noticed the above unpleasant symptoms. Now that I use a larger bag, these symptoms do not appear. My experience has also taught me that the gas is of little value when it is more than forty-eight hours old. I never use it when older than this.

"TAKING COLD."

BY J. FOSTER FLAGG, D.D.S.

PROFESSOR OF INSTITUTES OF DENTISTRY IN THE PHILADELPHIA DENTAL COLLEGE.

DURING the recent season of "thermometrical, barometrical, and meteorological" changes, it has so frequently occurred that the casual applicants for the operation of extraction have so unhesitatingly assigned the caption of this article as the reason for suffering, which has almost invariably been relieved in a few minutes by very different operations than the one suggested by themselves, that I have felt it possible that some good might be done in the direction of educating our patients indirectly, by calling the attention of fellow-practitioners to this frequently meaningless explanation of existing trouble.

The first perceptible change which is *felt*, as the effect of that form of altered circulation known as congestion, is a slight warmth, together with increased sensibility; but these soon give place to a benumbed, cold, and sometimes painful distention, indicative of a combination of excitement and impaired vitality. This, in an extremity or upon the surface, is attended with a decided change of size and also of color, becoming at first a deep red, and afterward purplish and bluish.

Internally, when organs are affected in this manner, we have the same sensations of pain and tenderness to the touch, and, in connection with this, we find sometimes increased secretion, as is the case with the conjunctiva and pituitary membrane, or diminished secretion, as in congestion of the liver; or, again, altered action, as exemplified by the nausea

and vomiting in congestion of the stomach; but the usual effect of this form of impaired circulation, if of any considerable extent, is, through the distention of the capillaries, to cause transudations of the more fluid portions of the blood through their coats into the surrounding cellular tissue, producing œdema, or into the intestines or other cavities, as in diarrhœa, etc.

It is in this way that we understand the *mechanism* by means of which exposure to cold does frequently induce watery evacuations, running at the nose, full and swollen face, headache, nausea, stiffness of the joints, impaired muscular action, and the whole catalogue of misery which ensues as the consequence of what is familiarly known as "catching cold."

Taking cold is a thing not only of daily occurrence among all classes of society, but it is mentioned, discussed, and condoled over by the rich and the poor, the educated and the ignorant, the robust specimen of health and the cadaverous victim of disease; and all these, it would be safe to say, have not even the most indistinct idea of what it is they have "caught."

If an individual complains of soreness, looseness of the bowels, headache, etc., some intelligent friend quietly suggests that "he's taken cold." If one is troubled with weeping eyes, feverish flush, feeling of anxiety, and constipated withal, there is scarcely a doubt but that *he's* "taken cold." But it is not in this general way alone that this somewhat peculiar malady announces its presence, for in our own practice *it is constantly given us* as a prolific source of trouble. It swells faces, it loosens plugs! it causes gum-boils, and I know not how many other disagreeable things.

It is a convenient term, from the very reason that, while it means anything, it at the same time means everything, and yet means nothing! There are few such in any language, and consequently it should be highly esteemed, if only for its rarity; and, when is added to this qualification its pre-eminent usefulness and facility of comprehension, who can wonder at its general adoption?

It is a term which, I am sorry to say, is too frequently employed by professional (?) men to express something of which *they* have no definite idea. A patient calls upon his—dentist, (we will say, for the sake of politeness toward general practitioners and other specialists!) and *informs him* that some ten days, two weeks, or three months after the extraction or plugging of some particular tooth, *pain*, which perhaps had been felt occasionally, but was not sufficient to command attention, had at last become quite annoying, and, so far from any mitigation of suffering having taken place, it had been for the past week continually growing worse and worse. The mouth is examined; the soft parts in the vicinity of the offending spot appear red and swollen; upon questioning, the operator finds that the patient knows *nothing* as to *why* this should be so, and that, if such a thing were possible, he knows even less. He reflects for a

moment—turns the entire nonentity carefully over in his mind—and then, as the relief which an idea affords is depicted upon his countenance, he slowly raises his head, and, with the gravity of a Solon, enunciates—“You have taken cold in that tooth.” Then follows the direction to make a local application of tinct. of myrrh; to be very careful in regard to exposure; to call again in a day or two if there is no relief, and in the mean while to “grin and bear it!” What the exact virtue of *grinning* is in these cases, I never have clearly understood; but I shall not lightly take it upon myself to say there is none, for were such the fact, it is, to say the least, strange that so much unanimity as to its existence should prevail.

In very many of these cases the patient is unable to continue this smiling endurance for a longer period than the “day or two” mentioned; and at the second visit the tooth is extracted, much to the mutual relief of sufferer and practitioner.

Very many of these cases are the result of plugging over exposed or devitalized pulps, or of the subsequent action of imperfectly protected arsenical applications, or of malocclusion, the encroachment of tartar, the overhanging of fillings, or, in short, from neglect, errors from ignorance or failures from incapacity.

That trouble, really due to the action of cold, may exist, I trust it would be superfluous for me to assert, but I regard it as equally unquestionable that comparatively few indeed of the numerous dental ailments which are by both patients and operators ascribed to it, do really arise from this particular irritant.

LITTLE THINGS.

BY J. S. LATIMER, D.D.S.

THE OCCLUSION OF THE NATURAL TEETH, when normal, prevents the biting of the cheek during mastication, the buccal and labial cusps extending without or beyond the corresponding portions of the inferior teeth and pressing the cheek away from the point of contact. If artificial substitutes are to be comfortable, this hint must be acted on in their construction.

IMPRESSION CUPS for the lower jaw are often too long to give a good effect. When this is the case, the impression will be imperfect just opposite and posterior to the mesial line.

TEETH MAY BE ATTACHED TO SILVER PLATES, with the vulcanite, by interposing between the silver and the rubber some tin foil, attached by the means of varnish.

GLYCERIN SOAP I have found to be one of the best things for the hands, especially in winter, when frequent washing is apt to make them

rough or chapped. For the removal of the black sulphuret of iron, which one is apt to get on his fingers in handling flasks in which pieces have been vulcanized, a piece of pumice-stone, having one smooth side, and that well soaped, is equal to anything I have used.

"BARNUM'S RUBBER DAM" is the name of a simple device for preventing the intrusion of blood or saliva during the operation of filling. A piece of rubber-tissue or bandage-cloth, as large as one's hand, perhaps, is pierced with a small, round hole. The elasticity of the rubber permits it to be pressed over the tooth; or, as an Emeralder would say, the tooth is thrust through the hole, and, by its contraction about the neck of the tooth, prevents the entrance of fluids. No napkin is required where this can be used. The suggester of this simple device is Dr. Barnum, of the City of New York.

ALLEN'S DAM is a simple, and, for many cases, effectual expedient recommended by Dr. Wm. H. Allen, also of this city, for pressing the gum back from cervical walls and preventing the exudation of fluids therefrom. One or more strands of floss silk is well waxed, and then it has a piece of either gold or tin foil rolled upon it so as to extend the whole width of the tooth on the surface from which the gum is to be pressed. This silk is then passed around the neck of the tooth and tied in such a way as to bring the roll of foil in the proper position to displace and compress the gum next the cavity. The roll is composed of gold, if the filling is to be of that material, but of tin, if Wood's metal is to be used in filling. The silk passes readily between the gum and the tooth and is easily tied.

SWISS BROACHES, nicely barbed by Mr. Sutton, (lately of the firm of Sutton & Raynor,) are highly recommended by Dr. W. A. Bronson, for the removal of dental pulps. He rarely fails in removing them entire from each root at the first attempt. He seldom uses a broach a second time.

RYE WHISKY is recommended by Dr. A. C. Castle to be administered in small doses before the administration of chloroform. He claims that the patient comes kindly under the influence of the anæsthetic, and that the pulse is much less depressed than it would be were no stimulant exhibited.

"PIN-HEAD" CAVITIES in approximal surfaces of the incisors and cuspids are exceedingly difficult to fill when the space between the teeth is inconsiderable. It is not too much to say, that in proportion to their number, as many failures occur with them as with large cavities.

I have lately adopted the practice of drilling a groove from the approximo-labial angle across the approximal surface far enough to include the cavity of decay in the groove, but not entirely across the tooth. A fine drill makes the first retaining point, (which will be near the approximo-palatal angle,) while a small flat bur or a hatchet excavator readily

makes the nearer one. Such a filling may show slightly, but the operation can be made more satisfactory than it could have been in the almost inaccessible little cavity.

THIN FINISHING FILES are easily broken; but this difficulty may be remedied by drawing the temper to a spring. Such a file is expected to cut gold but not enamel. After they become clogged and dull, they may be made to answer a good purpose by wetting them, and placing upon them a little flour of emery, with which they will cut the gold and tooth tolerably fast.

CLEAN NAILS are becoming to a dentist. Some most worthy practitioners are so unfortunate as not to realize this. There may be valid excuses offered for want of erudition and superior skill, but heedlessness of cleanliness can offer no excuse.

No man can earn "clean money" with dirty hands.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

REPORTED FOR THE DENTAL COSMOS BY R. J. HOFFNER, D.D.S.

A MONTHLY meeting of the Society was held Tuesday evening, June 7th, at the Philadelphia Dental College.

Dr. Louis M. Lusson in the Chair.

The following gentlemen were unanimously elected members of the Society:—

Prof. Richard Owen, London, Eng., Honorary member; Dr. Norman W. Kingsley, N. Y., Corresponding member; Dr. Jno. A. Myer, Mauch Chunk, Pa., Active member.

Dr. McQuillen presented to the Society a handsomely framed lithograph of the late Dr. Elisha Townsend. He also donated to the library the back volumes of the *Dental Review, London*, and five volumes of the **DENTAL COSMOS**.

Dr. Flagg moved that an especial vote of thanks be tendered to Dr. McQuillen for the picture of Dr. Townsend just presented to the Society. The lithograph is out of print, and on account of its rarity is rendered the more valuable.

A paper was then read on Dentistry for Humanity's Sake, by Thos. Wardle, D.D.S., Prof. of Mechanical Dentistry in the Philadelphia Dental College, of which the following is a synopsis:—

In considering this subject, Dr. Wardle referred to the practice of dentistry for the good of the race, without entering into an elaborate discussion of the theories involved in dental science.

He spoke of those who in other vocations had exerted themselves to

relieve suffering humanity on the battle-field or in the hospital, and whose gentle hands had done so much to relieve the agony of the sick, the wounded, or the dying, and thought that in dentistry there was a wide field for the labors of the humanitarian.

He noticed the evils which afflict infancy and childhood, regarding it as a barbarous practice to submit the infant, that may have come into the world with fully-developed temporary teeth, to the tortures of extraction. Humanity would suggest a different plan and allow the little one to retain its precocious dental organs, and protect the mother by the use of the nipple-shield. The period of first dentition, fraught with so many ills, he considered a critical one, and much depended upon the dentist to relieve the sufferings then experienced. In cases of tardy eruption of the teeth, due to a stoutly resisting gum, the proper and free use of the lancet was the most efficient means of relief. The premature extraction of the deciduous teeth was strongly condemned, and the advisability of impressing upon the parent a proper regard for the temporary set, warmly advocated. The treatment of irregularities is a subject to which the dentist should pay especial attention, for by proper treatment the individual whose misfortune it was to possess an unsightly set of teeth, might, if cared for in time, have them brought into their proper positions, and this the dentist should endeavor to do on the score of humanity, even though the operation be difficult and the remuneration slight.

The protruded lower jaw was another defect, which rendered the face unsightly, and by remaining so, might cause mortification to a sensitive patient when maturer years had been reached. He therefore regarded it as best to correct it early in life, when the bones were in a condition easily to yield, instead of leaving it until the density of the osseous tissue rendered the task almost if not quite futile.

He suggested the usual method of correction, that of applying a cap to the chin and one to the head, the two connected by straps armed with buckles, which enabled the straps to be tightened as occasion required, and thus as the proper shape was obtained, prevented the jaw from again assuming its abnormal position.

Dr. Ellis said that upon the announcement of the subject of the evening's essay, he had naturally formed a hasty anticipation of what was to follow; the manner, however, in which it had been treated, failed to corroborate his first impressions—the paper having reference to charitable but not humane operations, as the title had led him to infer. He regarded benevolence, whenever or wherever manifested, as a trait commanding the highest admiration; and entertaining a full appreciation of the value of the temporary teeth, believed that it was frequently an *imperative duty* to render gratuitous services, often trifling in themselves, but powerful in their influence upon the future comfort and appearance of the patient. Upon reflection, he considered that the subject, "Dentistry for Humanity's

Sake," might be easily construed to embrace the consideration of all efforts and practices having for their object the mitigation or entire relief of the pain commonly attendant upon dental operations, and regarded the expenditure of time in such endeavors as praiseworthy as it is humane and non-compensating. He thought there were two prominent requirements which a dental operator should keep constantly in view, and labor assiduously to accomplish in his manipulations, viz., thoroughness without pain; the latter consideration though last is not in all cases the least, for he was knowing to instances where the fear engendered by one rough and unnecessarily painful operation, had been sufficient to deter a patient from seeking the services of a second practitioner, believing them all alike, and preferring to lose his teeth rather than submit to such tortures. He regarded the hyper-sensibility of dentine as the most prolific source of pain in operations upon the teeth, and, without entering into detail relative to the many agents which he had employed for remedying this condition with variable results, would simply state that to chloride of zinc he would accord the preference, since it fulfills the requirements in the great majority of cases; he was aware that it was asserted in high quarters that it is seldom *successful* in arresting disease; but if, in spite of all the fine-spun theories which might be deduced in support of such an assertion, teeth so treated, present, at the expiration of many years, a perfect state of preservation, having in the interval performed their mission to the comfort and satisfaction of the patient, at what conclusion should we naturally arrive? There is another class of operators who recommend the use of kindness, patience, perseverance, and a "little sweet oil" to sharpen their excavators—three very excellent qualities to cultivate—and the keen-edged instrument undoubtedly a very useful adjunct in the performance of the operation; yet personal experience had taught him their inefficiency, and he felt satisfied that could those advocating such cruel treatment be themselves compelled to endure the *excruciating* pain they so thoughtlessly inflict on others, a rapid change in their views would be effected.

The paper had touched upon the commendability of laboring for the love and honor of the profession; he believed there were few who, like the writer, practice all they preach in this direction, and the advisability of such a course must be questioned when we observe some of its warmest supporters in theory ignoring it in practice. He regarded a man's chosen occupation as the means selected for procuring an honorable livelihood, and the remuneration, when merited, constitutes one of the strongest incentives to earnest effort; his first duty is to himself, and *secondly*, to the profession.

Dr. Gorges stated that he had been much interested in the essay read. It had been his aim to render operations as free as possible from pain, especially in cases of young children. He endeavored to remedy aching

teeth by some other resort than that of extraction. He thought the indiscriminate removal of temporary teeth much to be deprecated, as the after-effects have in many instances abundantly proved.

Dr. McQuillen thought that many of the disagreeable features in the performance of dental operations might be materially lessened, though they could not all entirely be removed, while the patients retained full possession of their faculties. In the treatment of sensitive teeth he had not derived as much benefit from the use of palliatives as others claimed. And when taking into consideration the statements of patients, and the acknowledgment on the part of operators who assert their ability to obtund the sensibility under *all* circumstances, except when their own teeth are affected, he was disposed, with all due respect, to think that they claimed more than they could truly accomplish. He believed, however, in neglecting no means that could be used for the purpose of relieving suffering. In a recent case, where the tooth was in a hyper-sensitive condition, after trying all the remedial agencies with the exception of arsenic, he had to rely upon a sharp instrument and many sittings, at each of which he had quickly removed a portion of the decay, and then dismissed the patient for a few hours or until the following day, and continued this course till the decay was all removed and the cavity properly formed.

He expressed himself decidedly in favor of truthfulness in dealing with patients: sooner or later the truth must be known, and it is just as well that the patient be made acquainted with it at once, and be prepared for what is to come. He favored *prompt* and *decided action*, and the *utterance* of *decided opinions* in cases which had been properly *diagnosed*, and in which unquestionable *prognosis* could be formed; but when the latter was involved in doubt, it was wrong to give a positive opinion. The proper course was to do what was demanded, and then wait and see what time will reveal.

In illustration of this part of his remarks, he referred to two surgical cases which had come under his notice that afternoon, in one of which, after a very brief examination, he at once diagnosed a fracture of the *tibia*, and communicated the same to the friends of the patient. In the other case it was supposed that the thigh of the patient had been fractured. On careful examination, the limb was not found shorter than the other, or the foot inverted or everted, nor was there any audible crepitation; but there was an entire loss of voluntary motion, and an apparent preternatural mobility when the limb was handled; under these circumstances, he had not ventured to give a decided opinion with regard to the existence or not of a fracture; he had, however, advised that the case should be treated as if a fracture had really occurred, until the exact condition of affairs had been determined by a more careful examination than the circumstances surrounding the patient at the time of the accident ad-

mitted. This he regarded as sound practice, and it is the one invariably advised by the highest authority in surgery.

Dr. Lusson indorsed pretty much all of what had been said. He could not, however, agree with those who would tell a patient that an operation was going to be very painful, for by this means an unnecessary apprehension was often created. He suggested that the operator remark that he could not say whether there would be much pain or not, and that he would endeavor to give as little as possible. He objected to the removal of a temporary tooth unless its permanent successor had made its appearance.

Dr. Flagg said that when he heard the caption of the essay for the evening, he had involuntarily prepared himself for a dissertation upon the importance and advantages of what might be termed a humane practice of dentistry, and the various attributes of knowledge, skill, gentleness, etc. had presented themselves as the necessary adjuncts for this; but he confessed that he had been more pleased at listening to the higher views than even these which had served as themes for the essayist. The practice of dentistry, for humanity's sake, did indeed form no inconsiderable part of the practice of *all who were able to perform the duties which it entailed*; but all who extracted the teeth of adults as the remedy for toothache, or tortured little children in lamentably ignorant efforts to "make room" for coming teeth in little jaws, were innocent alike of the duties or the compensation which comprised the task and the pleasure of humanitarian dentistry.

He had been agreeably disappointed, in following the essayist out of the somewhat beaten track of society papers, and only wondered that this phase of our specialty had so long escaped the notice of his fellow-members.

He desired, however, to embrace this opportunity for a few remarks in the direction of that humane dentistry which aimed at the alleviation of suffering without the infliction of more; that mode of practice which studied the means of reaching and removing the causes of trouble by such media as would preclude the possibility of their being hailed as anything else than *boons* to suffering humanity. This practice, he contended, could only be arrived at by thoroughly systematizing, and becoming conversant with all the various irritants and localities of irritation pertaining to oral and dental tissues, all known methods of manipulation and all proved remedial agencies. With this degree of education and a reasonable amount of experience, the dentist could and should daily impress, by the most convincing appeals to the senses of his patients, both old and young, that so far from being a terror and one to be dreaded and shunned, he was, in truth, "a friend indeed:" one to hasten in search of in the hour of suffering; one to give comfort in the time of need; one who practiced his profession truly for "humanity's sake."

Dr. Hoffner thought that if dentistry were to be practiced for humanity's

sake, the proper care of the deciduous teeth would be of the first importance. Parents are not sufficiently educated with respect to the importance of the temporary teeth, and their premature and indiscriminate removal was the occasion of an irregular permanent set which required correction, thus inflicting pain which might have been avoided. Or, if left uncorrected, the teeth presented an unsightly appearance, thereby rendering them a source of mortification to their possessor.

The Society then adjourned.

A MONTHLY meeting of the Society was held Tuesday evening, July 5th. The following paper was then read on

“NITROUS OXIDE GAS AN ANÆSTHETIC.”

BY R. J. HOFFNER, D.D.S.

In considering a subject, such as the one I have selected, and which has recently given rise to so much discussion in the dental profession, it may not be amiss to understand the meaning of the term anæsthesia. Dr. Snow, in his valuable work on anæsthetics, says: “The term anæsthesia has been frequently employed to designate the insensibility and suspension of consciousness caused by chloroform and ether; but in describing the effects of these agents, (anæsthetics,) I shall confine this term to its original meaning, privation of feeling.” But this definition, “privation of feeling,” can be correct only when the influence of the anæsthetic has been carried so far as to completely annul sensation, and it is a notable fact that operations of a serious character have been performed while the patient was in a condition to feel the instrument, while not the slightest symptom of pain was noticed. Anæsthesia would seem, then, more properly to imply privation of pain, rather than “privation of feeling” merely. But even this meaning would appear too broad, if critically examined, for it would imply privation of pain under any circumstance, while anæsthesia refers only to that produced by the administration of such agents as are capable of effecting a cessation in the system of the sensation of pain. But the administration of anæsthetics does not, of necessity, obliterate all sensation. The eye and ear may retain their functions, although in an altered condition, while the sense of feeling has been entirely blunted. But, it might be asked, what is sensation? Lewes, in his *Physiology of Common Life*, regards it as synonymous with consciousness, and in his arguments seems to consider it as the perception of an impression by the brain. Sensation he regards as always in an impressive condition, even when the individual be sound asleep; for if a remark be made with which the person is familiar, he will immediately awake. It is related, for instance, of Admiral Codrington, “who when a midshipman, could be always awakened from the profoundest slumber if the word ‘signal’ were ut-

tered, whereas no other word disturbed him." And this is true in many cases. The sound of a reader's voice may, as drowsiness comes on, cease to be heard; but let him stop, and instantly we are awake; or if wrapped in slumber, and the door be gently tapped, the first tap will serve to waken, though only the second is distinctly heard. In these instances it would scarcely be reasonable even to infer that no sensation had been created, for, had it been so, the individual would have slept on. The inference then, is, that sensation is always active, whether sleeping or waking, and external influences, therefore, always make their impression. Even the sense of touch remains during sleep to a certain extent acute, for if the ear or face be gently tickled, the muscles will contract as though endeavoring to get rid of the cause of irritation.

It is this sensation, so far as it is concerned in receiving painful impressions, that is to be overcome by the use of anæsthetics, and to effect which chloroform and sulphuric ether have been, and of late nitrous oxide to a much greater extent than ever before is being used. This latter agent is not, however, so serviceable as the others, its effects being too rapidly lost, and the difficulty in renewing its administration too great to render it of much value where long-continued insensibility is demanded. Nitrous oxide gas is, however, notwithstanding assertions to the contrary, an anæsthetic, and where the effect is needed but for a short time, as in the extraction of a tooth, it answers an effectual purpose.

It has been argued that the effect obtained upon the administration of nitrous oxide is due not to the gas itself, but to the inhalation of carbonic acid. But the effects of carbonic acid are not similar to those produced by nitrous oxide; for, as Dr. Snow says, "the sensations caused by inhaling chloroform are usually agreeable when it is taken merely for curiosity, and individuals who have inhaled nitrous oxide at some previous time of their lives, often describe their feelings as being *very much the same from both agents.*"

The following authenticated case of a young Frenchman, who committed suicide by inhaling the fumes of burning charcoal, will give an idea of the manner in which carbonic acid performs its fatal work:—

"A young Frenchman, named Deal, finding his hopes of making a figure in the world were daily becoming more chimerical, resolved to die; and that he might not quit the world without producing some 'sensation,' he left this written account of his dying moments: 'I have thought it useful in the interest of science,' he wrote, 'to make known the effects of charcoal upon man. I place a lamp, a candle, and a watch on my table, and commence the ceremony. It is a quarter past ten; I have just lighted the stove; the charcoal burns feebly.

"Twenty minutes past ten.—The pulse is calm and beats at its usual rate.

"Thirty minutes past ten.—A thick vapor gradually fills the room;

the candle is nearly extinguished; I begin to feel a violent headache; my eyes fill with tears; I feel a general sense of discomfort; the pulse is agitated.

“Forty minutes past ten.—My candle has gone out; the lamp still burns; the veins at my temples throb as if they would burst; I feel very sleepy; I suffer horribly in the stomach; my pulse is at eighty.

“Fifty minutes past ten.—I am almost stifled; strange ideas assail me; I can scarcely breathe; * * * I shall not go far; * * * there are symptoms of madness.

“Sixty minutes past ten.—I can scarcely write; * * * my sight is troubled; * * * my lamp is going out; * * * I did not think it would be such agony to die; * * * 10.—’ Here follow some quite illegible characters. Life had ebbed. On the following morning he was found on the floor, a corpse.”

This is not the only recorded case in which the horrible effects of carbonic acid have been manifested. The well-known suffering of the passengers on the Londonderry, where out of two hundred emigrants confined in a space eighteen feet long by eleven feet in width, nearly one-half died from the influences of the vitiated air. The dismal story of the unfortunate inmates of the Black Hole of Calcutta furnishes another example of the terrible death by carbonic acid gas, and every one is familiar with the experiments practiced upon dogs in the famous Grotto del Cano of Italy.

The inhalation of chloroform is not, however, productive of the same physiological action, as recorded by Professor Simpson, of Edinburgh, whose experience as the discoverer of the anæsthetic properties of chloroform, and his subsequent researches, render his observations worthy to be received as authority.

He says, in recording the physiological effects of chloroform: “After the first two or three full inspirations, a feeling of warmth and excitation, radiating from the chest to the extremities; followed by whirring noises in the ears; a sensation of vibratory thrilling, and benumbing throughout the body; with, betimes, rapid loss of sensation and of motion, and at last of consciousness. Often before total unconsciousness supervenes, the patient, guided by instinct rather than reason or volition, makes an effort to get rid of the inhaling vapor and handkerchief, as if it interfered with free respiration. During the full anæsthetic sleep by chloroform, sometimes no mental action goes on, or at least is remembered; in many others the mind is active as in dreams. The respiration is at first soporose; the pupil sometimes natural, in others slightly contracted, in others dilated; the pulse is usually quickened ten or twenty beats at first, but afterward falls to its normal rate, and, if the vapor is exhibited very long, in very powerful doses, it comes down more and more below the natural standard; muscles of voluntary motion in general relaxed; more rarely cataleptic; still more rarely clonically contracted, as happens also occasionally with ether.

"In small doses, given slowly, its effects are exhilarating, and *exactly like those generally following the inhalation of nitrous oxide gas.*"

If, then, the effects of nitrous oxide and chloroform be somewhat similar, it cannot be that carbonic acid is the effective agent in the inhalation of nitrous oxide, for there is no resemblance between their effects, and certainly the administration of nitrous oxide is not productive of sensations resembling those I have cited in the case of poisoning from charcoal fumes.

Again, nitrous oxide gas has been used since its introduction in thousands of cases, yet the deaths reported have been but few, probably not more than two or three, and, if I mistake not, these were cases in which organic disease was manifested. If, then, the anæsthetic effect was due in all these cases to carbonic acid, is it not fair to presume that the number of deaths would have been in a much greater ratio? If so poisonous an agent had been the means of bringing about the anæsthesia, the systems of weakly persons could not have withstood it, and our dental and medical journals would have teemed with cases which had proved fatal.

But arrangements have been effected by means of which the inspiration would convey to the lungs the nitrous oxide from the vessel in which it was contained, while the expiration was made into the open air, and in this case the anæsthetic effect was obtained as before, though it took longer to produce it, owing to the fact that the expiration being made into the air, necessarily some of the gas thus escaped, and a larger quantity was required. This would prove that the nitrous oxide itself, independent of any admixture with carbonic acid, produced the effect desired, and that as an occasional anæsthetic it might be rendered of service.

Like the introduction of everything new, however, nitrous oxide has been much abused. In the hands of charlatans it has been made to minister to the misery rather than to the happiness of mankind. Teeth partly decayed, and which might have been rendered serviceable to their possessor for years, have been ruthlessly extracted because a few inhalations of nitrous oxide produced immunity from pain, and hence lessened the horrors of extraction. Imposing upon the credulity of the patient, therefore, the wholesale administration of the gas would sacrifice teeth which proper care could readily have restored. The indiscriminate extraction of teeth, to which the reintroduction of this anæsthetic has given rise, cannot be too strongly condemned by the profession, and it remains for the class of intelligent, conscientious dentists throughout the country to use every possible endeavor to prevent it, and preserve to the individual teeth which no artificial substitutes, however skillfully constructed, can ever as perfectly replace.

The loss of a tooth does not involve as much inconvenience as the loss of a limb, but the operator who unnecessarily removes it, should, in so

far as the principle is concerned, be held culpable in common with the general surgeon who performs an unnecessary operation.

Dr. McQuillen said he did not regard the anæsthetic effects of nitrous oxide as due to carbonic acid. He believed that the position of Dr. Hoffner was a tenable one. If, however, nitrous oxide can be inhaled without the expiration being made into the receptacle which contains the gas, it would be more judicious. If this takes more nitrous oxide, and the expense to the dentist be thus increased, he must, of course, be remunerated. He thought that, as the subject of discussion was anæsthesia, it would not be objectionable to notice the effect of other anæsthetic agents than nitrous oxide. The effects of all anæsthetics are but transitory, and in some systems it is not advisable, after carrying the anæsthesia to a certain point, to progress beyond it. The suggestion has therefore been made that, when once the anæsthetic state has been reached, something else should be employed to prolong it, and to this end the salts of morphia have been injected under the skin of some of the lower animals while in an anæsthetic condition, and the effect has been to lengthen the state of insensibility. What the effect would be if tried upon man he could not say. His inability to procure a cat or dog on which to experiment, had led him to the use of frogs during the afternoon, and the results with them were quite satisfactory. A frog was anæsthetized, and remained so for two and a half minutes, when it regained its usual activity. The same frog was again influenced with ether and a subcutaneous injection of one-fourth of a grain of acetate of morphia made. The frog remained motionless for seven minutes, when it gave signs of returning animation by drawing one of its hind legs up to its body; but it was more than ten minutes before it was perfectly restored.

In repeating the experiments in the evening before the Society, the results were substantially the same. A frog, under whose skin an injection of one-fourth of a grain of acetate of morphia was made, gave no indications of having been influenced by it. A second frog was etherized, and the effect lasted about two and a half minutes. The same frog was etherized again, and one-fourth of a grain of morphia injected under the skin, when the anæsthetic state was prolonged to six minutes, and twelve minutes passed before complete recovery took place.

Dr. Kingsbury had been interested in the paper, and regarded it as of a suggestive character. He thought the anæsthetic property of nitrous oxide could be easily demonstrated by an apparatus containing an arrangement of valves, which would allow no carbonic acid to mingle with the gas, and would, therefore, permit only of the inhalation of pure nitrous oxide. He has had no experience with this anæsthetic, as ether and chloroform have answered so effectual a purpose as to obviate the necessity for using any other agent. He did not think that nitrous oxide could ever supersede the employment of ether and chloroform.

Dr. Flagg said that the point which he considered as demonstrated by actual experiment, and which he was not aware could be caviled at, was, that nitrous oxide really possessed anæsthetic power. It had seemed to have been a desideratum with some gentlemen that the gas should be administered in its greatest purity, without that admixture of carbonic acid gas which the usual method entailed as the result of exhalation into the reservoir or bag inhaled from. He had never been convinced of the importance of this by any of the arguments adduced in its favor, although, being open to conviction, he trusted, if he was wrong, that he might yet be enabled to see aright.

The *modus operandi* of nitrous oxide in the induction of anæsthesia was not so clear to his mind as even that of sulphuric ether, and by no means so much so as that of chloroform. It had been stated, in general terms, that the effect was due to intense stimulation. This, closely analyzed, was no explanation at all, in consequence of the ambiguity pertaining to what was termed "stimulation;" but it pointed to a species of violent exhaustion of vital force, which had led him to regard nitrous oxide as the least desirable as well as the least efficient of the three anæsthetics which were in what might be termed "general use," though the comparatively much greater employment of ether and chloroform hardly warranted the association of the gas as one of the trio. He considered that nitrous oxide, in the hands of one properly regarded as *incompetent*, would undoubtedly be the safest of the three anæsthetic agents above mentioned, but thought it unfair that such administration should decide the relative superiority or safety of any medication. Thought that in what would be regarded by educated authority as *competent* hands, chloroform was *the anæsthetic*, and that sulphuric ether occupied a very desirable middle ground, which rendered it almost impossible that its improper or "cautious"! use should be productive of anything more serious than severe headache or intense nausea, either or both of which could almost invariably be immediately relieved by a proper administration of the same agent. Thought that the matter of "large experience" should by no means be viewed as associated with *numbers*, as he had seen patients managed by gentlemen who had enjoyed opportunities which counted but by tens, for witnessing or inducing the anæsthetic state, in such a manner as fairly to shame those who claimed (and he believed truthfully) to have conducted hundreds of administrations.

Wished, while upon the subject of safety and experience, to state it as his opinion, that no agent which possessed the power of destroying all sensation and even all consciousness in so short a time as did any and all of the anæsthetics employed, could be regarded by any reasonable being as "a perfectly safe agent," in the common acceptance of the term—that is, *safe for any one* that professes to use it—but regarded it as unsafe for any one to employ them who was not *thoroughly posted* in all of the

little information we possess in relation to anæsthesia proper, the fair amount comprised in the anatomy and physiology of those parts which give *signs* of being consecutively brought under the anæsthetic influence, and the complete range of mechanical and medicinal therapeutics which have been proven available for the re-establishment of respiration and circulation. This he regarded as the least amount of preparation which would warrant, upon the part of any one, the employment of such potent agencies.

During experimentation upon frogs he had obtained results which seemed to disprove, to a certain extent, the assertions of the rapid action of the vapor of chloroform to cause cessation of heart pulsation. He demonstrated before the Society, by opening several of these animals and exposing their hearts, that quite long-continued projection of this vapor was impotent to effect this; and that, while the immediate contact of cotton saturated with chloroform was effectual in this direction, yet it was not surprising when we considered the well-known power of this agent as a local obtunder of sensation and motion.

On motion, adjourned.

INDIANA STATE DENTAL ASSOCIATION.

THE Indiana State Dental Association met Tuesday morning, June 28th, 1864.

President, Dr. P. G. C. Hunt, in the Chair.

Members present: Drs. A. M. Moore, Lafayette, Ind.; J. F. Canine, Crawfordsville, Ind.; P. G. C. Hunt, J. F. Johnson, G. A. Wells, Indianapolis, Ind.

On motion, the President appointed the following committees:—

On Order of Business.—Drs. A. M. Moore, J. F. Johnson, J. F. Canine.

On Membership.—Drs. J. F. Johnson, G. A. Wells, J. F. Canine.

The Committee on Order of Business reported the following subjects for discussion:—

1. Treatment of Exposed Pulp.
2. Stopping Teeth.
3. Pivoting Teeth.
4. Mechanical Dentistry.

The Committee on Membership reported the following gentlemen as applicants:—

Drs. Jos. Richardson, D. M. Weld, and Robert Van Valzah, of Terre Haute, Ind.; Drs. C. C. Burgess, Merit Wells, and A. E. Pursell, of Indianapolis, Ind.; who were balloted for and elected.

The following gentlemen were elected officers for the ensuing year:—

President.—Dr. A. M. Moore.

1st Vice-President.—Dr. J. F. Canine.

2d Vice-President.—Dr. D. M. Weld.

3d Vice-President.—Dr. C. C. Burgess.

Recording and Corresponding Secretary.—Dr. J. Richardson.

Treasurer.—Dr. G. A. Wells.

The retiring President then delivered an able and instructive address, which was well received, and a copy requested for publication.

The President elect having been conducted to the Chair, assumed its duties with some pertinent and well-timed prefatory remarks.

The following gentlemen were elected delegates to the American Dental Association, the President being authorized to appoint substitutes:—

Drs. P. G. C. Hunt and Joseph Richardson.

Adjourned to meet at Indianapolis on the last Tuesday of June, 1865.

DR. JOSEPH RICHARDSON, *Secretary*.

DR. A. M. MOORE, *President*.

The Secretary informs us that the subjects reported by the Committee were discussed, eliciting some novel methods of operating; but as he does not report what was said, the benefit of the suggestions is lost to our readers. Why will not reporters of dental societies give us the practical discussions, in preference to the business details, which are of local interest only? while ideas, theories, experiences, and observations are of value to the profession everywhere.—*

WABASH VALLEY DENTAL ASSOCIATION.

ORDER of business and subjects for discussion at the October meeting of the Wabash Valley Dental Association, to be held at Crawfordsville, October 25th, 1864.

ORDER OF BUSINESS.

1. Report of Committees.
2. Admission of Members.
3. Reading of President's Address.
4. Reading of Papers.

ORDER OF DISCUSSION.

1. Filling Teeth—Simple and Complicated Cavities.
2. Treatment of Dental Pulp.
3. Alveolar Abscess—its Treatment.

MECHANICAL DENTISTRY.

1. Artificial Dentures—Temporary and Permanent.

MISCELLANEOUS SUBJECTS.

1. Anæsthetics.
2. Professional Etiquette.
3. Unfinished Business.

J. W. FAHNESTOCK,
Committee on Order of Business.

EDITORIAL.

SENSITIVE DENTINE—ARSENIC, AND THE TREATMENT OF THE DENTAL PULP.

I HAD matured my system of using arsenic for treating sensitive dentine and the dental pulp before I became aware of its having been used by others in the profession; and when I wrote my thesis, during the summer of 1843, for the degree of Doctor of Medicine, on the Treatment of the Dental Pulp, I gave the different methods which I had become acquainted with, as any one can see, as my thesis has been long since published in the *Dental News Letter* as well as in pamphlet form, in such a way as not to claim any merit or originality, except that of the formula of *arsenious acid, creosote, and sulphate of morphia*. I regarded it as sufficient for each one to add his mite in improving our art. I referred to Dr. Greenwood, of New York, Dr. Ide, of Ohio, Dr. Spooner, of New York, Dr. Spooner, of Montreal, Dr. J. Brown, of New York, and Dr. Goddard, of Philadelphia. I gave my objections in my thesis to the different forms under which arsenic was recommended by those authors. I also gave in my thesis the following reasons why I adopted the use of arsenic in the formula I then and now use: 1st. The therapist teaches that arsenic destroys the vitality of living tissue by combining chemically with its constituents. 2d. The chemist teaches that arsenic is largely dissolved in the essential oils, and sparingly dissolved in water. 3d. The therapist teaches that if arsenic is not applied to a part in sufficient quantity to destroy vitality, it will be absorbed. 4th. That if it is in a condition to enter into combination rapidly, and in sufficient quantity to produce a speedy slough, it is not absorbed.

I remarked, in a note appended to my thesis, when it was published in pamphlet form in 1853, that the formula which has been given in the foregoing paper was suggested by the reflection that the best solvent, the most powerful narcotic, and the most deadly poison, properly combined, would be the most appropriate substances to best effect the destruction of the vitality of so sensitive an organ as the dental pulp. I further added: It is true that great care is necessary in its use, or it may prove troublesome or fatal to the health of the tooth.

Dr. Robert Arthur, of Washington, in a series of articles on the treatment of deep-seated caries, in the *American Journal of Dental Science*, remarks that "his first attempts with it were unsatisfactory, and he threw it aside for some time; but taking it up a second time, he was entirely successful, which he attributed to more care in its use and more knowledge of the subject than characterized his first attempts." I used arsenic down from the year 1838 to 1851, with few to support it, in the treatment of teeth, except those whom I have named.

At the Twelfth Annual Meeting of the American Society of Dental

Surgeons, held at Philadelphia, August 5th, 1851, there was a report to be made by a committee appointed for the purpose, of a series of aphorisms on the treatment of the dental pulp. If my memory serves me right, thirty-two aphorisms were read, but one or two were discussed, and the whole report was thrown aside. (*Dental News Letter*, 1851.) Drs. Dunning, Arthur, E. Parmley, (the President,) J. Allen, Foster, of New York, Cone, Westcott, Bridges, Hill, and J. Parmley engaged in the discussion, and all were opposed to the use of arsenic except Dr. Arthur, who held the following language: "I have always used arsenic in some form for destroying the vitality of the pulp before removing it, and still use it with satisfactory results. On first entering the profession, I applied it as well as I knew how, but with such bad consequences that I ceased to make use of it. I am indebted to Dr. White for hints which induced me again to turn my attention to its use, and for seven or eight years past have employed it with great satisfaction." After nine gentlemen had spoken on different methods of treating the pulp, and none favoring the use of arsenic, I rose to say a few words in defense of the use of that substance. (See *Dental News Letter*, October, 1851, page 187.) When partly through with my remarks, Dr. Westcott interrupted, putting a number of questions, all tending to throw doubt and uncertainty on the use of arsenic; and I never have had an opportunity before to say that the character of the questions displayed about as much want of knowledge of the subject as is still manifested by those who oppose its use. But I find no fault, except that it is time that dentists should inform themselves better as regards its use and properties.

This is all necessary in the history in relation to my connection with the use of arsenic.

J. D. W.

(To be continued.)

CREDIT.

THE following terse statement of facts, which are becoming apparent to all, we copy from *The United States Economist*. They apply with as much force to the relations between the medical and dental profession and their patrons, as to any other class.

"That the business of the country is substantially reduced to a cash basis is now evident. The importer refuses to sell his goods except for cash which he can immediately turn into exchange; the manufacturer declines to take in payment of his productions a fixed amount of money at six months, which on the day he receives it may not represent half the amount of property it did on that on which he sold his wares. The wholesale dealer cannot, under such circumstances, afford to give credit to his customers, even if he thought proper to speculate upon the future chances of the money market. The retail merchant, compelled to pay *sharp cash* for all his purchases, can give no more accommodating (but injurious)

credits to his customers, and so the consumer is obliged to pay as he goes, and purchase just as much as his present income may afford. And thus for the present *credit is dead*, and a condition of things has arisen when men are compelled to obey the injunction of the Scriptures to 'owe no man anything.' We rejoice in this fact for many reasons and on every ground. It checks unwholesome speculation; it prevents unnatural over-trading; it reduces the business of the country to its legitimate and natural extent; it makes trade safe and profits actual; it removes the temptation to personal extravagance, and takes away the inducement alike to over-importation and over-production.

"If every man in the community, from the highest to the lowest, pays as he goes, then is business safe, and reaction or revulsion, or bankruptcy, impossible. This state of things is accomplished by the inexorable necessity of our position. Let us rejoice in it as forming the great ground of our commercial safety."

REVIEW OF DENTAL LITERATURE AND ART.*

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

CRITICISM.—The beneficial results flowing from just and liberal criticism in every department of science, of literature, and of art, have been fully recognized by enlightened minds from the earliest period of the cultivation of letters down to the present day. And through this all-powerful agency, the defective observations and erroneous deductions of scientific investigators, the sophistical reasoning of enthusiastic but illogical minds, and the blemishes and imperfections of art, which sometimes mar even the efforts of men of genius, have been made apparent and frequently corrected.

It has been justly said that such duties "resemble those of the judicial station, and for their proper performance demand a high degree of those qualities which all men regard as indispensable to the expounders of law." "He who assumes them should be perfectly familiar with the subject upon which he sits in judgment; should be acquainted with the past history and present condition of its literature; he should be capable of skillfully analyzing thoughts and arguments, should be able to distinguish between the substance of true logic and the shadow of sophistry; should be familiar with the different modes of expression, and have a thorough knowledge of language; and he should have the independence to dispense his opinions, like the administrator of justice, with perfect impartiality—without fear or favor. As important truths may be clothed in the coarse garb of unpolished words, while frivolous thoughts or rare conceits may be decked in the tinsel drapery of a refined rhetoric, he

* Two communications prepared for this department have been laid over to the next number, so as to get this one out a few days earlier than the usual time.

should discriminate between the matter and the style of the works he examines. His gaze should be so keen as to penetrate all outer vestments, and enable him to study, without obstruction, the naked thoughts; and yet he must not be indifferent to language—that receiving his most unqualified praise which presents the least barrier between the author's ideas and the reader's mind.”

That these qualities are essential to a full and faithful performance of such duties, is beyond a question of doubt, and that their possession on the part of those who essay to perform such responsibilities is but rarely manifested, in a marked degree, is equally true.

Whatever qualities may be brought to the task, the object and aim should ever be, the advancement and elevation of science, of literature, and art. This is to be attained, not by a captious caviling manner, sneering at, and finding fault with everybody and everything, inducing one to exclaim—

“Of all the cant in this canting world,
Deliver us, good heaven, deliver us from the cant of criticism;”

but by a broad, generous, and catholic spirit, seeking to discover something of good in all things, and whenever the occasion warrants, giving that hearty commendation to merit which is justly due; at the same time, however, not hesitating in the faithful discharge of duty to direct attention, when necessary, to erroneous observations, defective reasoning, or the improper use of language. The latter duty is a delicate, and by no means enviable task; for while praise is more or less agreeable and acceptable to all, few persons, however desirous they may be of excelling and of being rid of faults, like to have their imperfections pointed out to them. That which is true of human nature generally, holds with peculiar force in the direction under consideration.

A writer, for instance, who by long consideration of a subject has familiarized it to his mind; viewed it as he supposes in all its aspects, and is, perhaps, favorably impressed with the manner in which he has presented it to the world, takes offense at the intimation that such and such positions are untenable; that a more intimate acquaintance or a broader view of the subject would have induced him to arrive at different conclusions; or that there is room for improvement in the matter or in the manner of offering it to the reader: in place of taking the suggestions good-naturedly, and profiting by them, he becomes offended, and allowing this to work upon his mind, eventually comes to regard the one who has taken exception to his article, or work, with anything but kindly feelings. The apprehension of such contingencies has over and again prevented that free and candid expression of opinion, which would have been alike beneficial to the writer and his readers.

The bitter feuds which sometimes occur between literary men, it is true, not unfrequently originate in this way. A writer taking offense at a

criticism of his efforts, responds, and in doing so becomes apparently personal. This, unless he has the good sense to pass it over in silence, brings out the reviewer, "and the word unkind or wrongly taken," leads from one thing to another, until at last the subject-matter is entirely lost sight of, and the affair becomes in the extreme disgracefully personal, to the amusement of the low and vulgar, but to the annoyance and disgust of all properly constituted minds.

There is no occasion or excuse for this; recognizing, however, the liability of its occurrence, care should be exercised to avoid it. In taking exceptions, for instance, to a writer, as nothing is more calculated to wound his feelings, or to engender antagonisms on his part, than to present the objections in an arrogant, dictatorial, or, still worse, in a patronizing manner, common sense, politeness, and the recognition of the fallibility of all human judgment, indicate that the objections should be presented *suggestively* and with an evident desire for *truth* rather than *victory*. If out of this a controversy arises, and personalities should be indulged in by either side, the opposite party should have the discretion to leave all the glory that can be gained by such a course to the side that first adopts it.

It does not follow, even when honest and well meant, that the objections urged against a writer are irrefutable. Far from it, for the eye of the intellect, like that of the body, is not equally perfect in all. In criticism, some appear always to employ a microscope to discover faults scarcely visible to common observation; and the slightest defect in construction or arrangement, typographical errors, etc., swell before their eyes into enormities. As they discover with great exactness, they comprehend but a narrow compass, and never conceive how small a proportion of that which they are contemplating, bears to the whole; or how the inaccuracies with which they are offended are absorbed and lost in the general excellence. Others seem to use a telescope, and see with great clearness whatever is too remote to be discovered by the rest of mankind, but are totally blind to all that lies immediately before them.

Lastly, advantage is sometimes taken under the cover of criticism, as a flimsy veil, to indulge a constitutional spirit of fault-finding by men who never have a good word to say of anybody or anything, and are constantly engaged in a vein of detraction, leveled in their absence, at their most intimate friends and associations, whether in business or pleasure. As a general thing, they are careful to so express themselves as not to indulge in assertions which can be brought home to them, but—

"Damn with faint praise, assent with civil leer,
And, without sneering, teach the rest to sneer;
Willing to wound, and yet afraid to strike,
Just hint a fault, and hesitate dislike."

When such persons take up the pen, their constitutional tendencies be-

come fully evident. To respond to them would be worse than folly. They should receive what they deserve—silent contempt.

If sometimes in the proper discharge of duty, truthful criticism appears severe, because it is true, and awakens a feeling of resentment, time and reflection will eventually beget a different sensation when the correctness of the judgment and the honesty of purpose that prompted it are fully appreciated and understood. The mind, like the body, is not always in good working condition, and the best informed and the most capable are then liable to errors of judgment and action. Under such circumstances, a word of advice may serve to correct errors and prevent their repetition, and a true worker will be obliged rather than offended at the one who offers it. In addition to this, when the advice is accompanied by the prompt acknowledgment of merit, and words of encouragement, extended to the young and unknown, who are struggling upward, by those somewhat advanced, it will strengthen, as it has strengthened, many a heart, and nerved many a hand to increased effort that otherwise would be heard from no more.

In the benefit accruing to the world in general from judicious criticism, dentistry, the youngest of the liberal professions as a *science* and an *art*, has derived and should continue to derive a fair share. Drawing as it does largely upon the collateral sciences—a wide and varied field—which demands the most constant and extended application to become thoroughly acquainted with them—an application which few have the inclination or industry to make—as a consequence erroneous statements, unfounded deductions, and other defects have crept and will constantly creep into our literature, and they should be corrected promptly without fear or favor, if it is desired that our literature shall compare favorably with that of other liberal professions.

THE DENTAL REGISTER OF THE WEST—JULY.

“WESTERN DENTAL SOCIETY.—The Western Dental Society met, pursuant to adjournment, at Jacksonville, Illinois, on Tuesday, July 7th, 1863, at 10 o'clock A.M.

“The following officers were elected for the ensuing year:—

“*President*.—H. E. Peebles, of St. Louis.

“*1st Vice-President*.—H. Barron, St. Louis.

“*2d Vice-President*.—A. Phillips, Missouri.

“*Recording Secretary*.—C. W. Spalding, St. Louis.

“*Corresponding Secretary*.—W. W. Allport, Chicago.

“*Treasurer*.—C. W. Spalding.

“*Executive Committee*.—W. W. Allport, Chicago, Ill.; C. W. Rivers, Pittsfield, Ill.; S. L. Edwards, Griggsville, Ill.; M. McCoy, Boonville, Mo.; A. M. Leslie, St. Louis.

“Dr. Spalding, of St. Louis, was chosen as the delegate to the American Dental Association.

“An appropriate address was made by the President on taking the chair; after which a discussion on *Filling Teeth* supervened.

“Dr. C. W. Spalding opened the discussion on this topic as follows:—

"The subject of *filling* cavities, including the various modes of manipulating foil, etc., has been very fully considered of late years by the different Dental Associations in this country; but, so far as has come to my knowledge, that important part of the operation which relates to the proper preparation of cavities for receiving the gold, or other material used in filling, has not received that attention which its importance seems to demand. We now propose to consider this particular division of the operation of filling teeth, believing it to be one upon which the ultimate success and durability of the succeeding steps in the work in a great degree depends.

"One of the most important objects in the preparation of a cavity is to secure a proper form—one that will retain the filling, and at the same time admit the packing of the material solidly and well into all its parts. The walls should be generally perpendicular to, or at right angles with either the face of the plug or the floor of the cavity. In order to obtain this form, it is sometimes necessary, when the cavities occur in the grinding surface, to first fill such undercuts as are protected by a strong overhanging shelf of enamel. And just here allow me to digress so far as to say that, having formerly found much difficulty in filling such undercuts with gold, either in the shape of foil or crystal, I have latterly substituted os-artificiel for the purpose, and have found it to answer admirably. This substance is easily moulded, and is readily trimmed out into the right shape after it has become sufficiently hardened. Undercuts occurring in the sides of the cavities nearest the gums should be resolutely cut away. They are often met with along the necks of the molars and bicuspsids, and in all such localities the right angular wall is absolutely required; without it, there is no certainty that the work will be durable, however well it may be done in other respects. But in the incisors a groove or hollow may be retained, provided a strong shoulder has been left by the separating file, and a little undercutting is also allowable at the opposite end of the cavity. In very shallow and broad cavities, especially when they are located in the labial surfaces of the incisors, some undercutting is almost necessary, but wherever it is practical the beveling or rounding off of the marginal corner of the cavity is particularly necessary, and should never be omitted. Indeed, the removal of this sharp corner around the edge of a cavity is always advisable, unless the filling to be introduced is of some plastic material; then, I should say, the sharper the corner the better.

"The instruments required by the operator for the preparation of cavities is very much a matter of taste or of habit. Some operators use, and think they must have, a great variety of patterns and sizes. I use but few. My main reliance is on the hatchet-shaped excavator, of different sizes and bent at different angles. One or two other forms are sometimes convenient, not to say necessary. Drills of several kinds, including the burr drills in variety, are very useful, though not indispensable. Every operator must decide for himself what instruments he will employ, discarding only such as do not facilitate the proper shaping of the cavity. Of late years I have made much use of small curved files, both in shaping and smoothing the walls of cavities in the grinding surfaces, and have found them especially useful in rounding out the sharp angles in those having an irregular form.

"Dr. J. H. Hyde, of Lewiston, Ill., suggests that in separating between the lower back teeth, especially the bicuspsids, the spaces should

widen toward the lingual side, for the purpose of allowing the easy removal of food, and thinks food would generally be dislodged in the act of mastication. In the upper jaw the spaces should widen in the opposite direction.

"Dr. Henry Barron, of St. Louis, prefers a V-shaped separation between the back teeth as a general thing; finds more difficulty in the preparation of large cavities in the lateral incisors than in other teeth, especially when the front wall is much broken away; makes narrow undercuts in such cavities; separates freely with file or wedge, or both; prefers cotton for wedging the teeth apart. Thinks a broken excavator makes an excellent drill, the fracture making a good cutting edge.

"Dr. I. Forbes, of St. Louis, in the preparation of cavities first cleans the outside of the tooth, so as to determine the extent of inside decay, then cuts away the enamel until he gets a straight line; likes to have the bottom of the cavity as near level as practicable; if fissures occur, opens them with a drill; breaks away the enamel as long as it breaks easily, particularly in the side of the cavity toward the gum; often even goes beyond the termination of the enamel, for the sake of securing a right angle in the wall of this portion of the cavity. For instruments he uses excavators of three shapes, hatchet, hoe, and scoop, together with several varieties of drills, including the conical and inverted truncated conical; employs a burr drill larger than the diameter of the cavity, for the purpose of countersinking, previous to filling; has latterly noticed a new description of files, which he likes; they are cross-cut, with one cut deeper than the other. In preparing the cavity described by Dr. Barron, he would cut away the front till the enamel was strong enough to fill against; thinks one is liable in these cavities to leave a little diseased bone, and that teeth often redecay from this cause; never begins to fill any cavity till he can see every part of it.

"Dr. J. B. Morrison, of St. Louis, employs chisels of various sizes in opening cavities; thinks it important that cavities are countersunk to prevent crumbling; takes off just enough to produce a dull edge; does not like undercuts, and avoids them as much as possible; wants the shape such that all parts of the cavity can be easily reached.

"Dr. C. W. Rivers, of Pittsfield, Ill., aims at the right angle, or something near it, in the general preparation of cavities, but does not object to a little undercutting; has filled undercuts with gold, but likes the suggestion of Dr. Spalding, of filling them with os-artificiel; always separates freely, so as to have plenty of room to work in.

"Dr. J. G. Nichols, of St. Louis, likes to have the inner diameter of the cavity nearly equal to that of the orifice; takes away all the weak enamel. In the case of bicuspsids, he uses a moderately thick separating file, and, after securing a right angle at the upper side, slightly undercuts the lateral walls of the cavity, making it a dovetail shape, and restores the original form of the tooth as far as practicable; has never employed os-artificiel for filling undercuts, but has used it to strengthen walls that were light and thin; uses chisels in separating, and then rounds the corners with a file; thinks Dr. Barron's case one of the easiest of cavities; does not like to see the form of the tooth marred by much filling or cutting away, and hence aims at restoring the shape with gold as far as it is possible to do it; has not used wedges of any kind for several years; even in the case of a child would not wedge at all, but would prefer to cut away as little as possible, and fill with less room to work in.

"Dr. Spalding relates a case where death of the pulp of a central incisor followed wedging, in the mouth of a lady over forty years of age.

"Dr. Forbes questions whether the wedging caused the death of the pulp, and does not think inflammation is produced when wedging is done with care. * * * * *

"The employment of the *Vulcanite Base* was favorably regarded by all present with the exception of Dr. Hyde, who has always entertained fears of poisonous effects resulting from the substance used in coloring vulcanite, and has not used it at all on that account.

"Dr. Cornelius, of St. Louis, also, does not think vulcanite worthy of general introduction. Corallite is better, for some cases; it can be repaired three or four times, and still be good; sometimes unites the gums of teeth with continuous gum enamel to prevent showing the rubber. * * * * *

"On the *Extraction of Teeth*. Dr. H. Barron declared himself an advocate of the free use of the gum lancet, preparatory to extraction; thinks he draws an indication from the cutting of the gum of the difficult or easy removal of the tooth itself. These remarks, do not apply to deciduous teeth. He has two or three pairs of forceps with which he extracts a large majority of teeth. One is a narrow-beaked instrument, originally designed for removing crowded teeth; another is a pointed beaked lower molar forceps; and the third an upper molar of Maynard's pattern. The only anæsthetic he uses is Bourbon whisky. When extracting upper teeth, he stands to the right of the patient, and a little behind when removing the lower. The elevation obtained by standing on a stool lessens the liability of striking the upper teeth; likes to rotate a front tooth when practicable.

"Dr. Edwards, of Griggsville, Ill., stands in the same position indicated by Dr. Barron, at the same time supporting the head with the left hand; rarely finds it necessary to use a gum lancet. * * *

"In the *Treatment of Exposed Pulp*. Dr. Spalding has not much confidence in any attempt to preserve the life of the dental pulp after it becomes actually denuded. If there remains ever so thin a covering of dentine or cementum, he would certainly advise an attempt at preservation. This is best accomplished by covering the floor of the cavity with some substance which we call a non-conductor, and then completing the operation by filling in the usual manner. But when the exposure of the pulp is complete, he never hesitates to apply at once the means for securing its rapid destruction. When once certain that the pulp is entirely extirpated, including the root canals to their extremities, he proceeds without delay to fill those canals in the most complete and perfect manner practicable. This accomplished, he feels that the tooth is safe, and the subsequent steps in the operation present no unusual difficulties; thinks the want of success often arises from delaying the filling of the root canals; treats a great many cases of this character; has more or less of them in hand constantly.

"Dr. Barron fills the roots of teeth in but few cases; prefers the mechanical removal of the pulp without resort to escharotics of any kind.

"Dr. Nichols always destroys exposed pulps, and also many that are *nearly* exposed. If the overlying matter is not sufficiently thick to admit the use of os-artificiel he would apply an escharotic and destroy the pulp at once; is careful to remove the entire pulp, and then fills the pulp chamber in the usual way; does not fill the roots in any case; is

generally successful when he feels certain that the root-canals are entirely freed of soft tissue, and can be wiped out with creosote, using it quite freely. When inflammation of the peridental membrane supervenes, he makes no attempt to save the tooth, but considers it past remedy.

"Dr. Rivers caps exposed pulps successfully with whalebone when in a healthy condition, provided the patient has a good constitution; in other cases he destroys and removes the pulp in the usual manner, and fills the roots to the extremity; considers such teeth, if well filled, of more value than artificial ones. In reply to a question by Dr. Nichols, he answered that he filled the roots for the purpose of closing the foramen at the apex of the root, with a view to prevent the ingress of fluids.

"Dr. Forbes remarked that he found it more difficult to succeed with lower teeth than with those in the opposite jaw, owing, as he believed, to the more ready discharge of fluids from the canals in the upper teeth during the treatment preparatory to filling. When he did not succeed in thoroughly clearing the canals, he dressed with astringents, to convert the soft matter into leather. If successful in this, he considered the chances good for preserving the tooth.

"Dr. Hyde fills canal and pulp chamber with os-artificiel."

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THE DENTAL REVIEW, LONDON—JULY.

ESSAY ON THE PATHOLOGY OF DENTAL CARIES.—The following is an abstract of an Essay on the above subject, presented to the *Odontological Society* in competition for the gold medal offered by Mr. John Tomes, and to the author of which, W. K. Bridgeman, the committee awarded the prize.

Desiring by no means to be understood as adopting or indorsing the views of the author—for there are points presented open to decided objections—it yet affords me much pleasure to commend a careful perusal of the abstract, on account of the methodical and straightforward manner in which the experiments performed and the conclusion arrived at are offered.

"*Introduction.*—The part played by electricity in the organic world has long been a perplexing puzzle to the philosopher as well as the physiologist. Its action in the animal system is looked upon as something distinct from that force which is usually denominated 'vital,' although it is admitted there is much that may be considered as identical with it; so much so, indeed, that it becomes a difficult question to decide whether the one or the other prevails, or to find a line of demarkation between them. In addition to this fact, there have been so many purely electrical phenomena at different times developed from the living subject, as to have given rise to various hypothetical arrangements of batteries supposed to exist in the human frame; and yet, strange to say, the one condition more than any other intimately associated with it has been the least attended to. Chemical action and electricity are known to be so far inseparable as to render it impossible that the one should be produced without, at the same time, the other becoming manifest; and it has been said by Professor Faraday that chemical action is often a more delicate test of electricity than the galvanometer. Yet, with the knowledge of electricity being thus developed in animal life, it is most surprising that, hitherto,

its electro-chemical effects in the living organism should have remained so little regarded. It has been demonstrated, also, by the same professor, that electricity, whatever may be its source, is identical in its nature; and it was supposed by Dr. Wilson Philip that the nerves which excite the muscles and effect the chemical changes of the vital functions operate by the electric power supplied by the brain and spinal marrow, in its effects modified by the vital powers of the living animal, because he found that, while the vital powers remain, all those functions can be as well performed by voltaic electricity after the removal of the nervous influence itself. It was announced by Professor Brande ('Philosophical Transactions') that when liquid albumen is made part of the voltaic circuit, it presents appearances dependent upon the power used, which, when considerable, excites so much heat as to coagulate it; but with a feeble power, and the poles sufficiently distant, coagulation ensues most plentifully at the negative platinum wire; a coagulum also forms at the positive wire, where acid is sparingly evolved. The preceding discovery having been made prior to the date of the electrotype, its significance remained unheeded; but the manner in which the metals are acted upon in being reproduced from their solution into the metallic state, and in any desired form, has become a fact so well known at this time, under the above title, or electro-metallurgy, as to render it a matter of less surprise that organic material should be dealt with in a somewhat similar way. In experimenting with a viscous solution, it was discovered that albumen from the egg, serum from the blood, milk, and other organic substances, were not merely coagulated, but were disposed in definite forms, with arrangements of parts, possessing characteristic peculiarities, resembling very closely some of those substances hitherto supposed to belong to that class usually regarded as vital productions. The earthy salts, likewise, are influenced in a peculiar manner. Not only are the salts of lime taken out of their original basis of bone and transported to other localities, and reproduced in the same or a different form of crystals, but the acid, being separated from its base, may be left free and uncombined.

"The chemical action of voltaic electricity,' says Faraday, 'is characteristic of that agent, but not more characteristic than are the laws under which the bodies developed by decomposition arrange themselves at the poles. Thus, whenever acid appears, it is invariably at the electro-positive pole, and may be taken as conclusive evidence of that condition, while the alkaline state evidences the electro-negative. Hence the external layers of the skin, the mucous membrane of the mouth, and the dentine of the teeth are, unquestionably, in an electro-positive state, and consequently, are liable to develop acidity. The source of this acidity may be either the serum of the blood or the saliva, the latter of which is so easily decomposed that I have obtained enough electricity of sufficient intensity from a battery contained in a small silver thimble to redden litmus paper in a few seconds, when moistened with saliva. Now, although we have occasionally an acid condition developed in certain parts, and occurring at one time more than another, this (except, perhaps, in such a case as the gastric juice of the stomach, etc.) may be considered as something abnormal; the normal action being that in which the change of elements goes on so slowly and regularly that the elements of each acid or base may be appropriated as fast as it is liberated, and so taken up as not to be allowed sufficient time to manifest either acid or alkaline qualities. Under these circumstances, it becomes extremely easy to explain

all the phenomena of dental caries as being produced by electro-chemical action; and as this abnormal action can be shown to be only part and parcel of the normal action, as developed in other parts of the system, and can be demonstrated out of the system from the same materials by the same means, there are strong grounds for believing in their identity of action. There are cogent reasons, also, for assuming that if any great advance is to be made upon our present stock of physiological and pathological knowledge, it will have to be sought for in this direction; and when there shall be found in one individual a union of the consummate skill of the physiologist and the electrician, organic matter may stand a chance of being taken to pieces and tortured to confession with as much pertinacity as has already compelled organic matter to yield up the history of its own existence.

"The author concluded with the following summary:—

"1. That the dentine can have no claim to be considered as possessing vitality, but that it is simply a vital product in an organic form.

"2. That the vessels of the pulp, namely, the nerve, artery, veins, and their capillaries, together with the vessels from the periosteum, are the only parts of the tooth endowed with vitality.

"3. That the pulp-vessels, together with the dentine and its enamel, in conjunction with the albuminous fluid, with which they are moistened, form an electro-voltaic series, and are a portion of the peripheral battery of the system.

"4. That the result of such an electro-voltaic arrangement is to withdraw the albuminous material from the blood circulating in the vessels of the pulp, and to effect its consolidation according to certain fixed laws.

"5. That the formation of dentine is due to this electro-voltaic action: the growth of the dental papilla to the size and form of the future tooth being purely an act of vitality, the subsequent deposit of membranous matrix, together with its becoming filled up with the salts of lime, are clearly demonstrated, by the artificial production of bone substances, to be due to a physical or electro-voltaic action.

"6. That any seemingness of vitality in the dentine may be ascribed to its being imbued with albuminous fluid, and constituting the positive element of a galvanic series, of which the negative is supplied by the negative vessels of the vital pulp.

"7. That local action, in an electro-positive element, constitutes the decalcifying and acidifying process in decay.

"8. That as some forms of carbon are among the most powerful electro-negative bodies in nature, this local action is first started by an electro-negative point of carbon, or by some want of homogeneity in the enamel or dentine.

"9. That it occurs in pits, fissures, or porous parts of the enamel, through a deposit of carbon, or by eremacausis of the membranous matrix, the organic portion of the enamel and dentine.

"10. That a minute portion of carbon forms an electro-negative centre, has been shown by the carbon placed in the notch of specimen No. 3 having protected that side of the tooth from electro-positive action.

"11. That the supposed death of the dentine is simply a well-known description of decomposition, common to all organic matter, and known as eremacausis or slow combustion.

"12. That the carbonaceous substance resulting from dry decay is at first alkaline or neutral.

"13. That it is only when it has become saturated with stagnant moisture that electrolytic action commences and acid is formed.

"14. That plain water is capable of producing an electrolytic decomposition of the dentine, and leaving acid in the decalcified tissue, but that fluids containing inorganic salts produce more extensive action.

"15. That sugar and water produce more decided effect than plain water, but that saliva is by far the most effective agent.

"16. That the various acids to be found in the mouth are derived from the separation of acids from their bases, together with the oxygen obtained from decomposition of the water forming the electrolyte, combining with different organic bodies or their elements contained in the saliva as it comes from the ducts.

"17. That substances taken internally are to be traced in the saliva, is shown by the voltaic detection of iodine after taking small doses of iodide of potassium.

"18. That, in respect to the progressing decomposition of decay, the enamel is sometimes found corroded in holes before any signs of decay have become apparent in the dentine, showing the organic matter mixed up with the enamel to be affected similarly with the matrix of the dentine.

"19. That the transparent zones of Tomes, or consolidation of the dentinal fibrils, is frequently the first change that takes place in the dentine.

"20. That when albuminous fluids are acted upon electro-voltaically, the albumen becomes consolidated in a definite form, granular and somewhat fibrous at the positive pole, highly transparent and jelly-like at the negative, and with a densely formed wall of substance transversely between them.

"21. That when dentine is electro-voltaically decalcified in albumen, the consolidated portion between the two poles receives a deposit of globular concretions of lime, almost identical in appearance with similar concretions seen in the edge of newly-formed dentine.

"22. That in all deposits formed in albuminous matter by electricity, a free border of transparent matrix remains unappropriated, which corresponds with the transparent rings and periosteal layer of bones, and the so-called formative membranes in the teeth.

"23. That the zones of secondary dentine, as also the portions of granular concretions adherent to the cavity or scattered in masses within the substance of the pulp, are due to the electro-voltaic deposit induced by local electro-voltaic action, and that, consequently, calcification of the pulp is to be induced by the same means.

"24. That in the consolidation of albumen electro-voltaically, the negative side is always alkaline, while that formed at the positive side is invariably acid.

"25. That in this respect it corresponds with the layers of the skin, where the blood-vessels in health are alkaline, while the epidermis and epithelium are acid.

"26. That it is this condition which produces the acidity in the mucous surface of the gums.

"27. In every case in which acidity can be traced in decaying dentine, the vessels of the pulp will invariably be found to be alkaline or neutral, thus indicating their different electro-voltaic condition.

"28. That the lateral spreading of a carious cavity, and its not more extensively opening out the pulp cavity is due to the electro-negative or opposite condition of the pulp serving as a barrier for its protection.

"29. That the dentinal fibrils exert the same negative tendency in protecting the walls of the dentinal tubes, causing the intertubular substance to be the first and the walls of the tubes to be the last to disappear, and hence the improbability of effecting the same condition artificially.

"30. That the decalcified surface of the carious cavity continues in a negative state as the decay proceeds, and thus keeps up the local action as it extends its area.

"31. That it is only after having lost the protecting influence of the healthy pulp that the cavity has its negative condition overcome by the positive, and merges into the decaying surface.

"32. That decay may be produced and carried on artificially by electricity, although the decalcified tissue requires the effect of time to accomplish its discoloration.

"33. That the notches at the necks of the anterior teeth greatly resemble the effect of local electro-voltaic decalcification of healthy dentine, as produced by these means, in specimens 13 and 14.

"34. That as too viscid a state of the albumen used in the electro-voltaic experiments was found materially to prejudice the condition of the deposit of lime, so the state of the albuminous fluid of the system going to form the dentine may be supposed to exert a similar influence on the texture and hardness of the tooth, as well as on its predisposal to decay, and thus account for the difference in this respect occurring in different mouths.

"35. That as the structure of the enamel shows it to be a portion of one of the globular crystals of lime formed in a viscid material, the so-called enamel fibres are but the characteristic features of the radiating form of its aggregated atoms.

"36. That, as the radiating lines in the enamel in their normal form are straight, the curves formed at the cusps are abnormal, and due to a disturbing cause during the growth of the tooth, which, by disarranging the accumulating crystals of enamel before attaining their full consistence, may lessen their cohesion, and thus predispose the parts to decay.

"37. That the dentine forming the crown of the tooth, being produced in lieu of, and occupying the place of, the cuticular layer of the skin, is consequently in a corresponding electro-positive state, but that the fang, being incased among the negative vessels of the cutis, is normally electro-negative, and hence, like the surface of the cavity in specimen 11, its negative condition induces the formation of tartar, which settles upon it, and also, in decay, prevents the cavity spreading down between the pulp and the periosteum much below the attachment of the latter, but when denuded of its covering and its connection cut off from the vessels, the exposed portion merges into the electro-positive condition of the crown, and thus becomes the victim of decay.

"38. That the influence of electricity is so palpably manifested in the generation of the covering substances, which are not liable to the same changes of absorption and reproduction as occur in the vital parts, and as the effect of every voltaic series is not that of combination alone, but includes decomposing powers as a part of its constitution, we can scarcely refuse to accept the decomposition of the tooth-substance as arising from one or more contingent circumstances connected with the same arrangement which has constituted the combining force in its production, and more especially as the effects arising in the mouth correspond so closely with the results obtained artificially by the same means."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Hare-lip. Lecture delivered at the Royal College of Surgeons, by PROFESSOR FERGUSSON.—“My first formal operation in surgery was for hare-lip, in the year 1828. The patient was a youth seven years old, and, as was expected, the result was satisfactory. The gap in the lip was complicated with one in the palate. For thirty-six years at least since then my attention has been given, more or less zealously, to these subjects; and, judging from what I have observed during that considerable period, I fancy that my experience on both has been as much as that of most men in this country. During that time I have seen many hundreds of both kinds of cases; and being about to frame a lecture for the present occasion, the question naturally arises, Have I anything new to say? I have in a manner exhausted the subject, as far as my knowledge goes, in my clinical teaching; but as a number of years have elapsed since I published either cases or observations, I believe that I cannot do better than refer to them both, and, while recapitulating some principal points, bring forward such others as may with you appear in some degree novel.

“To begin with hare-lip: I may state that there is no such resemblance to the lower animal in the human subject. The fissure in that animal [pointing to a diagram] is invariably in the mesial line; in man it never is. Of the many cases which I have seen I have never met with an instance in which there has been in the mesial line either a single or a double fissure; the defect has been always on one side, or both; and when it has extended to the alveolar ridge, it has also appeared on one side or both; while the mesial line, both in bones and soft parts, has been in a manner perfect.

“There is great variety as regards the mesial part of the lip: often it is slender, in all dimensions. In those instances where it is slender, it does not extend to the prolabial or free margin; and where there is much deficiency, it is usually associated with a flat nose and short columna; in other instances it is of fuller dimensions in all respects. In many examples of double fissure, the central portions are apparently thrust forward, and seem of extraordinary development; but these features, as also the flat alæ and expanded nostrils, I am inclined to attribute chiefly to defective bulk in the lateral portions of the alveoli. Here are specimens to illustrate these remarks. I have no doubt that an erroneous impression has sometimes arisen in this way. Here is a likeness, after an operation for hare-lip, showing the cicatrix exactly in the mesial line; and with some this might appear as a direct refutation of what I have stated. But here is the face before an operation was performed, and the gap was as large on the other side, and it was as marked an instance of cleft under each nostril as could be; in the operation the middle projection of bone has been taken away, while the mesial portion of lip has been used chiefly to form a columna for the nose. The result is a cicatrix exactly in the mesial line; and thus, I imagine, a most glaring example of the lateral fissures has been supposed to be a positive proof of defect in the mesial

line. I repeat, that I have never seen an instance of the kind; while I have seen some rare examples of fissure in the face elsewhere, such as in the eyes, cheeks, and lower lips. In the cheek I have seen a congenital fissure extend from the angle of the mouth to the malar bone, as it did in this instance before the sketch was taken, the fissure not being in the position where the ordinary fissure in hare-lip is. Indeed, in this instance there was a split lip in the usual position, on the left side; and in another instance I have seen a fissure extend from the angle of the mouth outward toward the masseter or angle of the jaw, as represented here. In one rare example I have seen a congenital gap in the lower lip, as represented in this diagram, extending from near the left angle of the mouth to the base of the lower jaw. It is the only instance of such congenital malformation that I have seen. As you may perceive, it is amenable to operation, and the gap was accordingly closed.

"In most cases of this malformation, where there is a fissure through the alveoli, as well as the lips, the central portion usually presents difficulties to the satisfactory accomplishment of an operation; and it has often been a nice question what should be done, either as to retaining or removing the part. In some rare cases there is no protrusion beyond the ordinary line. There is comparatively little protrusion in this instance to which I am pointing; you will see examples where the protrusion is much less conspicuous than there; but in the majority, if there is only a single gap, there is a projection forward, which may seriously impede the exact approximation of the edges at or soon after an operation. Before deciding such a question it might seem highly advisable to know what this part really is, and what may be its apparent importance.

"The most striking way in which I can bring the subject before you is to take the example of double fissure in the alveoli, such as you may suppose represented on this sketch. Now, whether the central part projects forward or not, there is a round knob, like the tip of a finger or thumb, according to age, which is familiarly known as the intermaxillary portion—a bone or bones; and while it has usually been referred to as single, it has also been spoken of as analogous to the premaxillary bones in animals of a lower grade. Some anatomists, such as Von Ammon and Vrolik, have displayed great research on the subject; but I know of no more minute anatomy in the English language than that in my own work on Surgery. There it was shown, that this projection consisted of two portions of bone, joining in the middle under the columna nasi, as in the normal junction of the superior maxillary; and you see before you the first specimen that I was ever acquainted with, illustrative of that feature. Two portions have been macerated in this specimen, and purposely held asunder, so as to show the gap between them in the mesial line. The first specimens that I had of this were procured by clipping the projection off during the operation, at its narrow neck above, in the line of the vomer. I have subsequently examined more entire specimens from the dead body. Here is a specimen, which I may show you as a contrast to that which you have just seen. The two portions are still held together, as in the normal condition of that malformation. I say, I have subsequently examined more entire specimens, procured from the dead body, and found that the united portions form a projection, extending upward and backward, by a narrow neck, until they join by a kind of symphysis with the lower and front end of the vomer. There is here a very strongly-marked example

of cleft palate, the cleft being remarkably large; and what makes it more peculiar is, that the septum of the nose has been thrust on one side; the premaxillary or inter-maxillary portion is also carried by it, or thrust to one side; and it so happens that this gives a more available illustration than we usually meet with of this fact, which, in as far as I know, may be looked upon as an original illustration. Here is the vomer from this specimen, magnified considerably; here is the inter-maxillary portion, also magnified; and here is the junction—the symphysis, as I have called it. Now, in the specimens procured from the living body we generally cut the two portions of bone at the narrow neck, through, where I am touching; and this remains ever after lost sight of. So far as I know, we have no dissections or illustrations illustrative of these points, on the adult subject, after operations have been performed.

“When the palate is split, as it very generally is, in the double fissure through the alveoli, the vomer sometimes has its only support below, in this inter-maxillary portion, or rather the projection seems to be an appendage to the vomer; for it appears to be supported in its position by that bone, and by the cartilaginous fibres and mucous tissues associated in the septum. Even in the youngest foetal human upper jaw it is difficult to detect the distinction between the inter-maxillary portions, equivalent to the pre-maxillary bones in the lower animals, and the true superior maxillary portions of this bone; but, curiously, while no line of the kind can be traced in the well-developed foetal skull, in the *front* part of the alveolar ridge, the suture remains tolerably distinct in the posterior portion of this bone, until a late period of adult life. In fact, fissure can be detected, in a very large number of specimens, on the palate, while in front it cannot be detected at birth, in the generality of instances, or at all events in comparatively early life. In the central portion, the two central incisors, deciduous and permanent, are each at the proper time usually tolerably perfect. The lateral incisor on each side, both deciduous and permanent, is generally of imperfect development, or altogether wanting, and instead of projecting downward usually slopes into the fissure; or, instead of projecting downward perpendicularly, it will project sometimes in a horizontal, and sometimes in another direction. It is often shed at an early period, from decay of substance, or from actually falling out entire, having a very indifferent socket. The canine, or eye tooth, generally makes a fair show, and is of tolerable use, although it projects inward in many instances, and is rarely to be compared with the normal tooth, or, I might say, the same tooth in the normal jaw. These are specimens very well worth looking at by those who are interested in the subject. So far as I know, they are comparative rarities, few surgeons having taken the pains and trouble to preserve them after operations, or look after specimens of the kind.

“Now, this inter-maxillary portion may be looked upon practically as one mass in the deformity now under consideration. It may vary in size, breadth, and thickness, also as regards its prominence; but it is always found in the skeleton as I have represented. I look upon this as a peculiarly valuable specimen; for it may be considered as a specimen in the adult—the inter-maxillary, with the two front incisors tolerably perfect. Here, for the purpose of illustration, the two parts have been parted and kept asunder; and in examining the alveoli, or examining the mass altogether, there is no appearance of any other teeth having been there at

all, although I have no doubt there would be some rudimentary appearances, probably, of imperfectly developed teeth, at a somewhat earlier period of life. When there is only one fissure in the alveoli, the mesial portion on that side has often a tendency to project forward, so as to endanger the success of the operation for the remedy of the malformation. In such a case I consider it best to cut the part away. The blade of a scalpel can readily be passed in the line of junction in the middle, and the division can be easily effected with a knife, if the subject be young. Here are several specimens of the kind; and here are specimens of one-half of the maxillary bone or bones.

"When the fissure is double, it has been proposed to bend the projection back by pressure, or after breaking its narrow neck; but I have noticed, on trying both plans, that the mass has been an impediment to a very satisfactory operation on the lip; and while I do not positively object to the occasional use of either of these plans, I decidedly give a preference to the removal of the projection altogether. If bent backward, it will probably be at the damage of the vomer and septum. Whether bent or broken, the teeth will be thrown on a new plane, and will be likely to project backward. I have recently heard it proposed, to cut out a portion of the narrow neck, so as to let the knob fall backward into a better place; but if this were done, I should doubt if the knob would not die from the want of circulation. Of course, if the part can be preserved in its natural position, that will be best; and if there be any slight projection, that will be gradually remedied by the pressure of the lip after the operation. However wide the gaps in such cases, it is remarkable how they close, as years roll on; for in many instances the opposite sides approximate so closely, that a fissure will almost elude observation in the adult subject. I have never seen a complete osseous closure. Close approximation gives strength to this condition of the upper jaw. In early years, where there is no lateral support, the inter-maxillary portion and the central incisors must be of little value as regards prehension, incision, or mastication, for the narrow vomer will give little stability in such case.

"Now, as to the causes of this defect, whether in the lip or jaw, I have no explanation to offer. I look upon most of the theories on the subject as proofs of how easily even educated men give a loose rein to the imagination. If this be the case among ourselves, it is not to be wondered at that, among the non-initiated, particularly females and mothers, the influence of the imagination is supposed to have a baneful effect. When we hear of mothers producing boys or girls at will—a son and heir, for example, or a daughter when the boys become more numerous than the governor may think right—then I shall believe in the influence of imagination. If imagination had much effect, there would never be a male heir wanted for our estates. If I may, or dare, venture a theory of my own, I am of opinion that the defect arises from the breed, and that it occurs when there is a predisposition in the parents. I fancy I can detect this in the features of father or mother, or both.

"Regarding the operation itself, my experience extends to between 300 and 400 cases. Prior to 1850, I kept notes of only a few such cases. At that time I was asked to operate on one which had baffled the best efforts of Mr. Liston and Mr. Lonsdale, and at the same time to use a spring or truss, to push the sides of the lips forward—an invention of Mr. Hainsby, the father of the child. The operation proved successful, and I

had good reason to be satisfied that the instrument had been efficacious. It is the instrument I hold in my hand, and you will see it in action in several specimens before you on the paper. Since the time I first used it, I applied it in upwards of 250 instances, and have every reason to recommend it as superior to any straps or other means that have been used for *drawing* the parts together. Its influence, you perceive, is for *pushing* the parts. Now, of these cases particular notes were taken, some of which are interesting: 146 out of 250, for example, were males; showing a large preponderance on the male side, which has not been explained, or much referred to: 153 were on the left side, showing a large preponderance there too. That is a fact that has been frequently observed by others; but here you have it in considerable numbers. Fifty-three were double fissures, and no less than 208 out of the 250 were associated with cleft palate: 169 of these operations have been performed in King's College Hospital. As to the results, three of these patients have died seemingly from the proceeding, not from bleeding or shock, but from some child's ailment supervening, such as the thrush or diarrhoea. I have never seen a single instance of convulsions afterward, at any period of life, and I have operated at all ages, from a few days old up to thirty-six years. Taking all things into consideration, I am of opinion that the earlier the operation is performed the better—assuredly before teething, and I decidedly prefer about the end of the first month. In a simple case and a healthy infant it may be done any time earlier, to within a few hours of birth. If the child is weakly, and the gap large, particularly if complicated with split palate, I strongly advise delay for some months, until additional strength is acquired, and also that the parts may be pushed closer in apposition by the use of the truss referred to. I have sometimes made babies wear this for many weeks or months before, and have always noticed its great value.

“In double fissure I have generally operated on both sides at the same time. Occasionally, however, I have taken first one and then the other, selecting the simplest, and performing the second operation a few weeks, possibly a few months, after. In some of these double clefts the middle portion of the lip has been so split, that I have used it for the columna, particularly in instances where the nose has been flat, when it has seemed needful to take away the mesial projection. The closure of the gaps or gap has always been a very easy matter; but where this part has been prominent, there has often been cause for much anxiety as to the result. The tension of the lip over this part has threatened to be too much for recent adhesions. In only one instance has there been total failure of union, and in that I afterward repeated the operation with success. In several cases there has been serious threatening of a non-union, by the gap opening an hour or two, or a day or two, after the stitches have been removed; in such instances I have scraped the surfaces, introduced needles again, and put all up as at first, and thus made the process appear only as one. This method I have rarely seen fail. On one occasion a child was running about eight days after a very successful operation for a single fissure. It unfortunately fell on its face, and at once split the union open. Although eight miles off, it was brought to me within a couple of hours, when I introduced needles afresh, and with the ordinary care the result was as perfect as could be desired.

“After trying a variety of lines of incision, and seeming cunning de-

vices, for adaptation of opposite surfaces, so as to give the best possible appearance to the lip, I confess that, with few exceptions, I consider the old-fashioned straight line, from the root of the cleft to the free margin of the lip, appears to me to be the best. If a notch or irregularity is left in the lip, it arises generally, I believe, from too little having been cut away. To make sure of a good and easy approximation of surfaces, I strongly recommend the free separation of each side of the fissure from the alveoli. Some have said, the frænum from the mesial line in a single fissure should not on any account be cut. It is often unusually large in such cases, and I confess that, from my experience, I see no reason why it should not be cut as readily and freely as any other part of the mucous membrane from the lip to the jaw. To take a refined view of a perfect operation, I myself find the most difficult part to be that of bringing the opposite sides so accurately together that the margin between the mucous membrane and skin should meet on a proper level. It is a very common thing, to have the red part on one side a little higher than the other; and, with all the pains one is inclined to take in these cases, I have often myself been disappointed as to the result. There are many sketches here illustrative of that circumstance. It is one kind of consolation, that in some of these cases the operation may be repeated at some future day.

"The position of patient and surgeon during the operation deserves some notice. I have often seen the operator sit or stand in front of the patient; and in general, before the work has been finished, his face and dress have been splattered over with blood, saliva, and mucus. A far better plan is to be behind, or at the side, so that all the annoyance referred to may be avoided. In infancy the head should rest between the surgeon's knees; he should sit; and in the adult the operator may stand behind a chair on which his patient sits, or the head or side of a table on which he may lie. In either of these postures he may escape the unseemly damage to personal appearance to which I refer. A few of my infantile patients have taken the breast after the operation; but most have been fed by hand, and some modern devices with sucking bottles have been of great service. Many of these observations are of no novel character; but possibly the experience that I have had may render them of additional value. It may perhaps be thought that, in bringing this minor subject of surgery before you in these lectures, I deal but lightly with my position. You may have noticed already, that I look upon some of the so-called minor subjects in surgery as by far more important than some imagine. But, in extenuation of my present course, I may refer to the circumstance that the illustrious Roux, in writing the experience of forty years of surgical practice, did not disdain this topic, and actually made it the subject of one of his famous letters to 'Cher Lawrence,' his equally distinguished and experienced contemporary."—(*Med. Times and Gaz.*)

Cleft Palate. PROF. FERGUSSON.—"Experience in hare-lip naturally implies some experience in cleft palate; and I hope that I am not taking an additional liberty in placing this subject in association with that already referred to. In further apology, I may state that both the surgery and anatomy of cleft palate are entirely of modern date, and within the time to which I have limited the scope of these lectures. The early history of the operation

for cleft palate sounds like a romance. In 1819 a medical student applied to Roux, then one of the surgical luminaries of Paris, with a defect of this kind. Roux pared the edges of the cleft, and brought them together with stitches; union followed, and the palate became like a normal one; and when the youth appeared among his friends again, the change in his voice was such that he could scarcely be recognized as the same person. I doubt if this case, although fairly made public by Dr. Stevenson, in his general dissertation on velosynthesis, when taking his degree at the University of Edinburgh in 1820, produced the full effect on the surgical mind that it should, even when further elucidated in the famous essay by Roux, published in 1825. Possibly, the rarity of the occurrence and the difficulty of the operation led to apathy; and, down to the period of Roux's death, no one seems to have had any experience on the subject at all equivalent to his.

"Like others taking their early surgical lessons in the third decade of the present century, I was attracted by the romance referred to; but I had seen little to absorb special attention. While busy in dissecting-room work, a subject with cleft palate came under notice. At that time, as even now, I suppose, few students took the pains to dissect the palate; but it was my fortune to have this one to luxuriate upon. I made a careful dissection of all the muscular parts, and came to the conclusion that I had rarely seen it so highly developed, although the palate and throat were small, being those of an aged female. The whole matter fell aside for years. I had performed the operation on the living body, and I heard of others doing so, without success.

"The subject, on this side the Atlantic, at all events, in a manner slept, with the exception of the doings of Roux himself; but about 1840 all Europe, in a surgical sense, rang with the brilliancy of Stromeyer's operation for club-foot and Dieffenbach's for strabismus; tenotomy and myotomy became the fashionable surgical mania, and I bethought me of my former dissection of the cleft palate. For anything I knew, it was original. I compared it with the normal condition anatomically and physiologically, and then reflected on what I had heard and seen of surgery, as applied to this condition, by Roux and others. My zeal was further stimulated by a paper by Dr. Warren, of Boston, which told of a larger proportion of success by Dr. Mutter, of Philadelphia, and himself, than to my knowledge had yet been attained by any others, not even excepting Roux. On additional reflection I fancied that I had fallen upon new views in anatomy, physiology, and surgery, and my conclusions were embodied in a paper which was submitted to the Medical and Chirurgical Society of London in December, 1844. That paper was honored with a place in the volume of *Transactions* for 1845. Its main features went to show how the cleft was closed in deglutition by the action of the superior constrictors of the pharynx—how the palato-pharyngei in cleft palate acted differently in this state than in the normal palate, and instead of closing the opening between the pharynx and the larynx, in reality tended to draw the parts asunder—an act which was overbalanced by the vigor of the upper constrictors of the pharynx. Above all, looking to the surgical aspect of the malformation, I gave it as my opinion that the action of the levatores palati probably exercised such an influence on the lateral portions of the palate after the operation of Roux as to mar its good intentions. I showed, in as far as one could, by reference to the dead and living parts,

how the levator muscle on either side had such free and uncontrolled action that, whenever excited, it drew the margins of the clefts upward and outward, and so tugged upon the stitches put in by the surgeon, that ulceration in their sites and separation of the junction was a most probable result—that, indeed, which had caused the failure of Roux's operation in so many instances. The inferences which I drew were that, if the palato-glossus, palato-pharyngeus, and levator-palati on each side were divided, the soft flaps would hereafter for a time be so relaxed that in all probability the mesial line of adaptation would be so little disturbed that union would take place. The tensor-palati, I considered, would have little disturbing influence; nor did I put much importance on that of the palato-glossus. My impression was, that the action of the palato-glossus and palato-pharyngeus, particularly that part in the posterior pillar of the fauces, was likely to prove detrimental; and, in accordance with the somewhat novel and already popular practice of myotomy and tenotomy in other directions, I recommend the division of these muscles, as adjuncts to the ordinary operation for cleft palate.

“By modern custom the department of anatomy associated with the Professorship of Surgery in this College has been held of comparatively little account, although both my predecessors have displayed remarkable acquirements in this direction, which they have turned to great account in the field of surgery. As your Professor of Human Anatomy, I hope I may not be out of order in claiming to be the first who solved the problem of how the cleft in the soft palate is closed during deglutition. The drawing influence of muscles has been most recognized; the pushing has been less taken into account, although it is very considerable. Swallowing, the vermicular action of the intestines, defecation, are notable examples of this force, just as palpable in the estimation of the anatomist as the drawing of the biceps in flexing the arm. Anatomy without physiology would be in a manner senseless; but when joined together they give life and soul to surgery. The influence of the constrictor muscles of the pharynx in the process of deglutition was well known to physiologists; but how, during that process, the gap of cleft palate was closed in the vacant space which I point to in these various sketches, was an enigma, until I had the good fortune to show that the parts are pushed together by the action of the superior constrictor particularly, so that the gap between the pharynx and nostril is completely closed during deglutition, as if the velum were entire.

“Then for the surgical aspect. After the investigation I showed that by temporarily taking off the influence of such muscles as in common action tend to draw the two portions of the cleft aside, there was a probability of such entire rest that union in the central line was most likely to take place—certainly, at any rate, more likely than with these muscles in full vigor, irritated as they might be by the wounds, by the inflammation, and by the presence of stitches. The almost intolerable distress, the depressing influence, the actual danger in the injunction against swallowing, laid down by Roux and others, made the early operations of this kind examples of human endurance which few could follow out to the full extent. Such injunctions had been occasionally disregarded; and Sir Philip Crampton gave some notable examples of the kind. Since I showed, anatomically and physiologically, that during deglutition the parts are actually pushed together, the process is no longer forbidden; and now a

fair share of suitable nourishment is freely permitted—a matter of great importance, as regards the successful issue of any operation. With a single exception, which shall be nameless on such an occasion as this, I am not aware that any anatomist or surgeon of repute has controverted my views, as expressed in the paper referred to; nor need I do more than advert to the amiable and flattering device of a continental admirer, in bringing them all out anew in a few years after, as if they were his own. I have heard of nothing yet to impugn the anatomical explanations which I first gave of how various hap-hazard incisions might or might not facilitate the approximation and the adhesion of the margins of the cleft in the soft palate. The knife for dividing the levator-palati was my own device; and here are many of the instruments which were used by my own hand at an early date.

“Those who have devoted attention to cleft palate during the last twenty years must have been surprised at the recent dispute as to the priority of separating the soft from the hard palate, with a view to close the cleft in the hard. Dr. Mason Warren described his process in 1843, and it was referred to in my original paper. I myself performed it in January, 1845, and have since repeated it on all fitting occasions. The late Mr. Avery devoted special attention to this portion of the palate, and after his death the subject was further ably developed by Mr. Pollock, in a paper published in the *Medical and Chirurgical Transactions* for 1856. The first idea that I had of this portion of the operation for cleft palate was obtained from Dr. Mason Warren. I deem it but fair to the reputation of that distinguished surgeon to state that I know of no originality before his, and that I look upon all modern claims to such originality as arising either from ignorance or a desire to rob the fair reputation of a name which, in son as in father, will stand for generations among the brightest in surgery.

“Although working at the subject of cleft palate since the date of my first paper, I cannot pretend to add much that is novel to the views which were then expressed. I have little to add and little to retract from the anatomy and physiology which I have ventured to submit as original. I am still as much convinced that the tensor-palati has little or no influence on the soft palate—certainly that it has none to counteract the closing of the gap. The palato-glossus, I am of opinion, has no practical influence, and, except in rare instances, I am convinced from experience that there is no necessity to interfere with the palato-pharyngeus in the posterior pillar. I am equally convinced of the value of dividing the levator palati. There is ample experience to show that union has taken place, despite muscular action to the contrary. The experience of Roux and others has proved that; but I know of no experience equal to my own to prove what I contend for—namely, that, by taking off the muscular action for a time, union can be rendered more certain than by leaving the muscles untouched. Since I entertained the views referred to, I have operated on 134 cases, and of these 129 have been successful; in two union failed entirely; and in three it was so partial and imperfect that I placed them as unsuccessful. Forty-five of these operations have been performed in public. In a considerable number an aperture has been left in the hard palate, and much benefit has been derived, in many such cases, from the use of an obturator.

“I have never attempted the operation in infancy. I consider instances

most favorable at or above the age of puberty; but I have frequently operated successfully at ages between ten and fifteen, where patients have been steady and courageous. I have never operated under chloroform; and, while I do not deny the possibility of doing so, and cases of the kind have been recorded, I am of opinion that, as a rule, it is absolutely requisite to have the patient conscious, so that he may facilitate the steps in a variety of ways.

"This enumeration includes all kinds of cases, and refers chiefly to the cleft in the soft palate. In many instances of cleft in the hard palate it is utterly impossible to contend against nature; and even in the soft the parts are occasionally so scanty that there is literally no material to work upon. In so far as I know, the greatest success recorded, before my own views were made public, was that achieved by Mutter, of Philadelphia. In 1843 he had operated successfully in nineteen cases out of twenty; and Dr. J. Mason Warren, of Boston, had been successful in thirteen out of fourteen. These instances are both of hard and soft palate. What may have been their success since I cannot say. It has been related of Roux, since his death, that he had operated on 120 cases, and that of these one in every three had failed. I attribute Roux's comparative want of success to the circumstance that the levator-palati and the back part of the palato-pharyngeus were left untouched; and I consider that Warren's success may have resulted from the free incisions which he made through the palate, outside the pillars of the fauces. My own success, if I may so call it, I attribute chiefly to the division of the levator-palati; and next, to the relaxation which the wound for that division involves. For mere relaxation, the incision of Dieffenbach, which I show here, is probably the most perfect. I know that it has been particularly successful in Mr. Skey's hands and in Mr. Pollock's; but, with all deference, I am still disposed, from all I know of the subject, to prefer a free incision above the soft palate, whereby the levator-palati may be divided to a certainty. In addition, I look upon this wound as of great service in this respect. The lymph effused upon it acts as a splint, whereby the palate is kept fixed as on a board, until union in the mesial line is complete.

"As to attitude in this operation, the patient may sit or lie, as may best suit convenience. Latterly I have made most use of the recumbent; I find that the head can be kept best on the same line in this position; and as regards my own views on the anatomy and physiology of the parts concerned, I deem the subject of some importance. For instance, if the patient sits with the head slightly thrown backward, the palato-pharyngei, when irritated, pull the soft palate downward, as my own do at the present time, in the attitude my head is in, so as to leave a space between the palate and the base of the cranium; but if the head be thrown far backward, as I throw it now, the axis of action is altered, and these muscles draw the soft parts upward, or, in other words, bring the soft palate toward the base of the cranium, and thus add to the difficulties of the surgeon, by limiting the space above the soft palate, where he has to work with needles in introducing sutures. I say upward, with reference to the base of the skull; but in reality, when the head is much bent, it would be drawing downward, as it were. Here, as in hare-lip, the surgeon has generally stood before the patient; but I invariably select his right side in preference to all other places.

"The grand practical object of this operation is to improve the voice

and articulation. Defective deglutition from this malformation is what attracts the mother's or nurse's attention in early years. The cries of infancy are in nowise peculiar in tone; but when definite articulation commences, or, rather, should commence, the value of an entire palate is then appreciated. The air and sound, in passing outward from the larynx, escape in part through the nostrils, from the split in the palate; a nasal twang is the result, and articulation, as in the normal state of the parts, is impossible. Immediately after operation the modification in the voice can be at once detected. It is customary to keep those operated upon from speaking for eight or ten days; it is, however, a needless restriction, as regards my operation. In reality, few care to speak under the circumstances; yet I do not think it would do harm. In the course of eight or ten days, when the fever or distress following the operation is gone, the tone of the voice is at once perceived to be changed for the better; improved articulation, however, comes more slowly; years, many years, are required for distinct articulation, when the whole organs are, to all appearance, in perfection; and, after the most successful operation for cleft palate, months and years are required to alter defective sounds. Voice and speech have to be modified anew. With some, the changes come slowly and sluggishly; with others, they are so rapid and perfect that in a few years the original defect cannot be detected, excepting by a practiced ear."—(*Ibid.*)

"Carcinoma of Lip. Clinic of PROF. S. D. GROSS.—This disease attacks almost exclusively the lower lip, and usually begins in a small bluish tubercle, in a warty excrescence, or in a fissure. It is peculiarly a disease of advanced years. The present instance is an exception to the general rule, and is on this account particularly interesting.

"J. F., an Irishman, aged 33 years, has a small tumor on his lower lip, which is beginning to ulcerate and cause him much trouble. It first appeared six years ago, but after suffering from it for a few months it was removed, and has only reappeared within the last year. Since then its growth has been rapid, puckering and tightening the parts.

"The disease is essentially scirrhus, modified by the structure of the tissues. All the organs have their peculiar formation and habits, which exercise a controlling influence. In the lip there must necessarily be epithelial scales and other material not found in scirrhus of the breast or liver. This exercises a modifying influence, so that the malady is not so fatal as true cancer. It is commonly known as epithelioma, canceroid, or epithelial cancer; is tardy in its growth, and usually assumes the encephaloid form when it reappears after removal, increasing rapidly; then nothing can arrest its progress, as it involves the cuticle, skin, lip, gums, jaw, teeth, and even the ganglions of the neck.

"Professor Gross removed a large V-shaped piece from the lip, and placed the raw edges in exact apposition, as in the operation for hare-lip. Three pins were introduced, embracing two-thirds of the thickness of the lip, including the arteries, and stopping the hæmorrhage. The ligatures were wrapped around the pins in an ellipse, not in a figure-of-8, as is usually done, and were carried from one to the other, thus intimately approximating the parts. The tissue in this part of the body is very elastic, but there will necessarily be great tension, from the large size of the piece excised, though even then there is generally union by the first intention.

"The two lower pins should be removed at the end of the third day, and the upper one twenty-four hours afterward. The diet should be nourishing, and the general health properly attended to; for the better this is, the less likely will the disease be to return.

"The pins were removed three days after; the parts have perfectly united, and there has not been a single unfavorable symptom. The lip is very much tightened, but will gradually yield."—(DR. WM. H. BARTLES, *Med. and Surg. Rep.*)

"*Tumors.*—In Guy's Hospital Reports, MR. S. BRYANT lays down the following general rules to assist a differential diagnosis in reference to these growths. 'The more simple and innocent a tumor, the more nearly it approaches in structure the highly organized portions of the body; the more malignant a tumor, the more it approaches the most elementary or embryonic. In proportion, therefore, to the amount of the cell element in a tumor, may its cancerous tendency be determined; and the greater the proportion of the fibrous or well-developed structure, the greater the probability of its nature being innocent or simple. Simple tumors will never do more than separate the parts between and beneath which they are developed; cancerous tumors, as a rule, infiltrate the parts, but never separate them. The skin may be stretched and attenuated by a simple tumor, so as to ulcerate or burst; but it will never be infiltrated with the tumor's elements. The skin covering a cancerous tumor becomes rapidly involved, it seems drawn down to it, and as if glued to its surface; and when ulceration has commenced, the edges are palpably indurated, thickened, and infiltrated with cancerous products. Cancerous tumors have a marvelous tendency to multiplication, and never exist for any period without implicating the lymphatics of the part with which they are connected. In a case of tumor the nature of which is doubtful from both its local and general conditions, the presence or absence of an indurated absorbent gland (not an inflamed one) will tend more than anything else to solve the problem. The recurring fibroid tumor is a connecting link between innocent and malignant growths. They have a constant tendency to return, after removal, either in the same place or in the neighboring parts. There is nothing distinctive in their external character by which they can be known. Microscopically they possess more of the cell element than the innocent form, and the more rapid the development of a tumor the more cellular its structure.'"—(*Med. and Surg. Rep.*)

"*Permanganate of Potash in Infecting Ulcers, Ozena, etc.*—After enumerating the divers disinfecting agents lately proposed, and coal tar in particular, the author, (DR. H. PROSS, of Leipzig,) does not hesitate to give his preference, at least under circumstances, to the permanganate of potash already recommended by Girwood in 1857, and later by W. Hoffman, of London, and by Dr. Reclam.

"This salt disinfects rapidly the most fetid ulcers, in the proportion of two scruples to eight ounces of water in lotions or injections. The most favorable method is to cover the wound with lint soaked with that substance, and to place above this a layer of raw cotton, the latter having

the property of filtering the air, and to retain the germs which determine putrid fermentation. In cancers of the womb it is necessary to repeat the injections several times a day.

"The permanganate of potash serves also a very good purpose in freeing the hands from any bad smell contracted in post-mortem examination. For this purpose a stronger solution may be used, (*m. i. to oz. i.*) It is preferable to chlorinated water, not only as a disinfectant, but also as preservative of contagion.

"In ozena a weaker solution should be used, (*m. i. to oz. viij.*) and to correct the odor of decayed teeth, two drops of a concentrated solution of this salt may be used in a glass of water as a wash, or a few drops of a weak solution may be introduced in the cavity of the tooth on a small piece of cotton.

"The same solution will be found useful in correcting the bad smell of the feet.

"It is probable that the therapeutic application of this salt will, by further experiments, be extended to many other cases, such as scald head, fevers, pityriasis, etc."—(*Paris Med. Gazette* and *Ibid.*)

"*Artificial Larynx.*—M. EDMOND FOURNIER, at a late sitting of the Academy of Sciences, produced an artificial larynx composed of India-rubber pipe and several keys and pedals, by means of which the action of the natural muscles is imitated and sounds similar to those of the human voice are produced. This apparatus is constructed according to the inventor's theory of the production of sound, founded on a long and patient investigation of the construction and action of the larynx."—(DR. W. N. COTE, *Ibid.*)

"*Aphasia.*—PROFESSOR TROUSSEAU, in one of his late clinical lectures at the Hôtel Dieu of Paris, dwelt on a peculiar complaint, the symptoms of which are the inability in the patient of pronouncing certain words, and of expressing his thoughts, retaining at the same time the full use of his intellectual faculties. M. Broca, who first directed attention to this malady, called it *aphæmia*, which term M. Trousseau, aided by the celebrated philologist, Littré, considers wrong, as it really means 'bad repute.' *Aphasia* is better, as *φασια* means 'a word,' and with the privative *a* indicates 'a want of words.' 'Nor should we,' says M. Littré very justly, 'take the first person of the present of the indicative, as *φειμω*, to form substantives.'"—(*Lancet.*)

Reunion of Dissevered Nerves.—"PROFESSOR LAUGIER, one of the surgeons of the Hôtel Dieu, has recently made a most important communication to the Academy of Sciences. In an operation performed on the arm, and in which the median nerve had been severed, that skillful surgeon united by a suture the two ends of the nerve. Almost immediately after signs of sensibility were observed, and in a few days more the nerve had entirely recovered all its properties of sensation and motion. I need not insist on the importance of this case, which throws such a new

light on physiological pathology of the nervous system. No longer than two weeks ago, in a discussion which took place at the Society of Surgery, it was affirmed by several members that the regeneration of the nervous tubes, which alone could cause the recovery of sensibility and motility, was the work of weeks and months, and could not immediately take place. Such also was the opinion of M. Brown-Séquard and of MM. Vulpian and Philippeaux. These two gentlemen published last year a memoir which received academical honors, and in which they gave the relation of different experiments they had made, the result of which is entirely opposed to that recently obtained by M. Laugier. The memoir of that eminent professor, read at the Academy of Sciences, has been the scientific event of the week.”—(*Paris correspondent of Lancet.*)

“*Grafting Animals.*—DR. PAUL BERT has published a work on the curious subject of animal grafts. He succeeded in making Siamese twins of a couple of rats, and in many other monstrosities. He exclaims, ‘it is a surprising spectacle to see a paw cut from one rat live, grow, finish its ossification, and regenerate its nerves, under the skin of another, and when we plant a plume of feathers under the skin of a dog, what a miracle to see the interrupted vital phenomena resume their course, and the fragment of a bird receive nourishment from the blood of a mammal.’”—(*Intellectual Observer.*)

Symptoms of Dangerous Anæsthesia.—“DR. B. W. RICHARDSON bears testimony (*Brit. and For. Med.-Chir. Rev.*) to the accuracy and importance of M. Simonin’s observations. Dr. R.’s experience, like M. S.’s, and derived from long research, is that the muscles which raise the lower jaw are the last that collapse under the use of anæsthetics. Hence we have seen more dangerous symptoms during profound anæsthesia for operations on the mouth, such as extraction of teeth, than under any other circumstances. The exposition of M. Simonin is also in our opinion exceedingly sound and common-sense, and we specially recommend his advice respecting the necessity of observing the contraction of the elevators of the jaw to those who are learning how to administer narcotic vapors with scientific judgment and knowledge.”—(*Amer. Jour. Med. Sci.*)

Organic Chemistry.—“The recent advances in organic chemistry are thus detailed by a writer in the *London Pharmaceutical Journal*,—DR. MACADAM. He says, ‘not only does the manufacturing chemistry of the day transform starch and sugar into alcohol by fermentation, as in brewing operations; sawdust into oxalic acid by the action of soda and nitre; starch or sawdust into grape-sugar by the aid of sulphuric acid; wood and coal into paraffin and paraffin oils by the process of destructive distillation; coal into aniline and the coal-tar colors; and guano into a magnificent color, rivaling that from the cochineal insect; but the organic chemistry of the day has proceeded to produce artificially many alcohols and ethers, including jargonelle pear essence and pine-apple essence; and

to construct many alkaloids resembling quinine, strychnine, and morphine in their composition and chemical properties, encouraging the hope that we may soon be in possession of the means of preparing by artificial processes these powerful medicines, and possibly others equally efficacious. And more than that, and principally through the researches of Berthelot, dead mineral matter has been worked up by stages into organic compounds. Thus Berthelot, taking carbon and sulphur, combines these into bisulphide of carbon, a mobile, ethereal liquid; and therefore, by the mutual reaction of copper, hydrosulphuric acid, and the bisulphide of carbon, he obtains olefant gas. The latter is absorbed by sulphuric acid (oil of vitrol) to the extent of 120 volumes of the gas in one of the acid, and thereafter by dilution with water and distillation, the acid mixture yields alcohol of the same composition and properties as that obtained from ordinary grain. Strecker takes the olefant gas in solution in sulphuric acid, and by adding water, neutralizing with ammonia, evaporating and heating, obtains crystals of taurine, one of the constituents of bile. Wöhler combines the simple elements, nitrogen and oxygen, by electric discharges, into nitric acid, and then by the successive mutual reaction of this nitric acid with tin, hydrochloric acid, and black lead, and lime, (or oxide of lead,) he obtains a complicated organic substance, called the hydrocyanate of ammonia. The latter may also be prepared by passing a mixture of the gases ammonia and carbonic oxide through a red-hot tube. The hydrocyanate of ammonia may then be employed in yielding cyanogen, hydrocyanic acid, (prussic acid,) oxalic acid, and urea; also formic acid, paracyanogen, cyanuric acid, sulphocyanogen, and mellon.

“When cast-iron (which contains carbon) is dissolved in dilute sulphuric or hydrochloric acid, there is evolved a volatile oil resembling turpentine, and there is left in the vessel a small quantity of graphite, and a brown mould resembling vegetable mould. Ordinary carbonate of soda (washing soda) can have carbon extracted from it, and if the latter is acted upon by dilute nitric acid, and the solution evaporated, an artificial tannin is obtained, which has the property of precipitating gelatin or glue from its solution, like ordinary tannin obtained from gall nuts or oak bark. Berthelot has taken carbonic oxide and caustic potash, and compelled them to produce formic acid, (yielded naturally by red ants;) and with a single link of the chain wanting, he has manufactured glycerin, which is the base of fatty substances, and combining it with the fatty acids, he has prepared artificially the oils and fats generally obtained from the plant and the animal, and many more new oils and fats not known in nature. Berthelot has acted upon glycerin by putrefying animal matter, and obtained artificially grape sugar; and has converted oil of turpentine into ordinary camphor and Borneo camphor; while, in conjunction with De Luca, he has prepared artificially one of the chief constituents of oil of mustard, (sulphocyanide of allyl.)

“These researches in organic chemistry may appear, at this, the moment of their birth, to have little influence on the arts and manufactures and on mankind in general. But are they not researches into the deep mysteries of nature? and who can predict the influence which they may yet have on the prosperity of the human race?”—(*Annual of Sci. Discovery.*)

Metallic Silver deposited from the Nitrate.—“A bright deposit of metallic silver may be produced from a strong solution of the nitrate by

means of a thick alcoholic solution of tannin; and if the liquid be evaporated to dryness, the coating will become pretty firmly fixed to the surface. A like coating of copper may also be produced from a saturated solution of the sulphate by means of tannin."—(*Pharm. Journ. and Canada Lancet.*)

Plumbago or Graphite. MR. JOHN G. BROUGH, England.—"The old mineralogists, misled by its remarkable metallic lustre, placed graphite among the metals, and at the present time there are doubtless many persons who accept 'black-lead' as an appropriate name for this substance. In most dictionaries graphite is defined as 'carburet of iron,' in accordance with the opinion formerly held by most chemists that it was a compound of carbon and iron. This definition is now known to be incorrect, for although iron is generally present in graphite, it must not be regarded as an essential constituent, any more than the silica or alumina which usually accompanies it. The iron, silica, and alumina, when present, are simply in a state of mixture, and not chemically combined. Graphite is one of the forms of carbon, that protean element which also occurs native as the sparkling diamond and the black and lustrous anthracite, and which also appears in the familiar shapes of charcoal, coke, and lamp-black. According to Dr. Wood's analysis of a sample of the graphite used at the Battersea works, it contained upwards of ninety-eight per cent. of pure carbon, the remainder being silica with mere traces of iron and alumina. Few samples have been found to contain less than ninety-five per cent. The veri-form character of carbon is exhibited by graphite itself, for it is sometimes crystalline and sometimes amorphous. The crystallized, or foliated graphite, is found occasionally in six-sided tabular crystals, but commonly in foliated or granular masses. It is chiefly obtained from Ceylon, where it is found imbedded in quartz. It is also found near Moreton Bay, in Australia; in the States of New York and Massachusetts, and in Siberia. The amorphous graphite is that variety to which the terms 'plumbago' and 'black-lead' are ordinarily applied. It is much softer than the crystalline graphite, and makes a blacker streak on paper. Formerly it was obtained almost exclusively from Borrowdale, in Cumberland, but the mine there is nearly exhausted, and we believe is no longer worked. The bulk of that used at present comes from Germany, principally from Griesbach, near Passau. Both varieties are used in the manufactures of the company; the crystalline for crucibles, and the amorphous for polishing powders."—(*Sci. Amer.*)

Artificial Ivory.—The possibility of procuring a substitute for ebony and ivory has become an important question, now these materials command such extravagant prices. M. GHOULSTON GHISLAIN has brought before the French Academy a substance which he asserts answers this purpose completely. He produced it by the following method: Take 60 per cent. of the powder of marine plants, 15 per cent. of glue, and an equal quantity of coal tar; boil till thoroughly mixed; dry in an oven at a temperature of 300° Fah. till it becomes plastic. The compound will assume the appearance of ivory by heating it in an aqueous solution of caustic potash, and letting it macerate for several hours in diluted sulphuric acid; after which subject it to the action of chlorine or chloride of lime, repeating the operation till it becomes perfectly white."—(*Ibid.*)

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, SEPTEMBER, 1864.

No. 2.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Inflammation of the Dental Pulp.—This may occur, without the presence of decay, from a blow, the contact of extreme heat or cold, or inflammation of the external membranes, excited by tartar, or when the tooth has become much denuded of the gum. It is not unfrequently true, that patients call in suffering from pain in a sound tooth—inflammation from tartar as above stated. Well, what is to be done? In the first place, remove the tartar, cause the gums to bleed as much as possible, apply laudanum, aconite, or acetate of morphia; let the case go a day or two, and in many instances you will give relief. Such was true, two years since, with Mr. B. He called, suffering great pain and soreness to the touch, in the second inferior bicuspid. We removed the tartar, caused the gums to bleed freely, the pain subsided, and the tooth became useful and comfortable, until a few days ago, when he called again, suffering; but this time the tooth was so very loose that we were obliged to extract it. He thanked us much for giving him the use of the tooth as long as it could be retained by the gum and alveolus; but sometimes this occurs to a large molar, when only one root is involved.

Mrs. M., aged sixty years, was visiting Cuba last winter; she suffered from extreme sensibility to the contact of cold in the second superior left molar; she consulted a dentist, but he could find nothing the matter with the tooth. When she arrived in New York, she consulted another dentist, but nothing seemed to be the matter. Coming to Philadelphia, she called upon us. Upon careful examination, we found that the posterior buccal root was denuded of the gum by recession, but without the presence of tartar. The patient was an incessant brusher; the

root was very smooth. We could pass a fine probe over the end of it. The palatine and anterior buccal roots were well imbedded in the gums and sockets, and the tooth was comparatively firm. We drilled a hole into the root at the bifurcation, from the anterior tooth; found the nerve alive. We applied the arsenical paste, and by two applications succeeded in removing the whole of the pulp; but to make the second application of the paste, we drilled through the crown of the tooth; this might have been done in the first place. When the bleeding subsided, we *amputated* the denuded root at the bifurcation, plugged it toward the crown, rounded off the parts, found a little tartar between it and the palatine root, removed it, and in a few days plugged the pulp cavity and palatine and anterior root from the crown, as well as the hole we drilled. The tooth is perfectly comfortable and useful. We frequently amputate the roots of teeth, and they do well, if the roots remaining are firm in the gums. A surgeon, in the army, called to consult us in consequence of extreme pain in the lower jaw, left side. His teeth were all good; some tartar; the gums rather spongy. We removed the tartar, applied a narcotic to the gums, waited two days: still the pain continued. It was difficult to decide which tooth caused the pain; but we drilled the first molar, killed the pulp. We drilled two holes, one opposite each root; destroyed the pulp; in two weeks plugged the pulp cavity, and the case is perfectly comfortable up to this time. It was treated six months ago.

(To be continued.)

TEMPERAMENT.—No. 3.

BY WM. H. ATKINSON, M.D.

Read before the New York Society of Dental Surgeons.

TEMPERAMENT is the result of admixture and separations of the elemental primates of bodies. Those that are quite transparent, permit the light to pass through them in all directions without obstruction to perceptible degree; while the opaque preclude the sensible passage of the pencil of light.

So the absolutely colorless, white, and black are molecular modifications of the primal mucus, being but degrees of differentiation from the ethereal nerve mass in which pure spirit holds its court, to demonism of the darkest and most differentiated bodies possible of pronouncement in the domain of the correlations of entities of which bodies are constructed—no body being absolutely clear nor positively opaque in the whole range of visibility.

The pronouncement of temperament is as dependent upon the pre-determining molecular conditions, as are words upon the arrangement and character of letters. And the best in the school of temperament is

not yet past his *a b abs*, or, at most, long words of one syllable, clearly, distinctly, and rapidly pronounced.

This, however, should not deter us from plodding our weary way among the dis, tris, and polysyllables, until we are enabled glibly to *read* the various modifications of original or acquired temperament as they may be presented, and thus deduce at once the capabilities of the person before us.

All tissues are different in the degree of oxidation of the prime constituent, and hold molecular life in exact equivalency of fitness, or similarity of tension of ghost and habitat, the loss of which balance sets up, on the part of the tenement, a demand for the tenant, whose compliance with the demand is properly the act of inspiration, which takes in not only the true tenant or ghost, but also oxygen to further oxidize the tenement, so that the deoxidations and expiration of their products may not too far impoverish the tension of the constituents of the tissue, and render it unfit for the diastole, digestion, and systole, without which in exact equipoise of activity, we can have no tissue or health of its function.

Thus the original conformation of tissue marks its character for definiteness or indefiniteness, distinctness of pronouncement, or tendency of emergence into the next allied class of tissue; so that predominance of certain character or quantity of the constituents of bodies prevails to such infinite variety, that it is next thing to impossible to arrange a nomenclature that shall be definite, and yet broad enough to include all varieties of the modifications of organization properly called temperament.

White and black being the reflection of the whole pencil of sunlight, and its absorption so nearly absolute, that we have only the negative of the white light in the black; these bodies have no prismaticism, and therefore reflect no colors.

Transparent and semitransparent bodies prismaticize the sunbeam, and thus produce the infinite degrees and modifications of color; while such portions of prismatic bodies as are devoid of prismaticism proper, and yet endowed with some degree of opacity, add the degrees of light and shade to the colors produced as stated; thus adding infinitely to the modifications of colors and shades.

Now, as there are originally three prime colors out of which the seven so-called primary colors, with all their admixtures or temperaments, take origin, we may safely say of temperaments of bodies, that there are also but three necessarily primary temperaments,—dermal, vascular, and osseous,—each of which holds dominion for a time of the structure in the order here set forth: from skin to vessel and bone, wherever ossification is attained; which is in general the most differentiated of structures. So that we may say temperaments indicate the arrest of the tendencies to complete differentiations. I would here say that the completest of all

differentiation of living animal bodies, is found in the most completely crystallized enamels; this tissue being the structure of mergence between the mineral and animal kingdoms, must needs partake much of the character of the former, and little of that of the latter to fulfill its legitimate mission in the animal economy.

If we trace the evolution of the animal germ from conception to its highest status of organization, we shall discover that it is at one time nothing but derm and endoderm, or skin and contents, skin being the same as the contents, only one degree more oxidized; this vesicle holds within its grasp the type of all temperament possible to the class to which it belongs. And those who serially pass throughout the whole range are alone complete in their development; while those who only complete two and a part of the third primal stages of evolution, are to the degree of the deficiency in a foetal state during their stay in the imperfectly developed condition. This is the point of inception of pathological states that have so deteriorated the race by the propagation of imperfectly developed types to the tremendous multiplication of demonism, instead of the regular physiological divinization resultant upon full development and spontaneous obedience to the law of type of perfection of organization.

Is it any wonder then that there is such variety in modifications of temperament itself, and the far greater variety of apprehension of what temperament is, when we consider for one moment how exceedingly scarce individuals must be who are endowed with the full measure of temperamental ability, that all have a right to demand of their progenitors as their legitimate birthright? I have said that there could properly be but three primary temperaments, viz., Dermal, Vascular, and Osseous. Now these, like the primal colors, have ranges of mergence toward the indifferent spirit, the different crystalline body, and toward each other: out of which arise seven well-pronounced temperaments, after the manner of the so-called seven primary colors, which, in fact, are but three with their blendings and divergences.

Those are—1. Most indifferent Nervose. 2. DERMAL. 3. Glandular. 4. VASCULAR. 5. Sanguine. 6. OSSEOUS; and the most indifferent, 7. Crystalline.

Thus we see that the body is first one sea of nerve mass, or unpronounced mucus. Next this sea becomes inclosed in a skin of oxidized mucus, constituting a cell or proper prototype of vessel, which, by modification of its character and relations, serially becomes glandular-vascular, (proper producing arteries and veins, which constitute the) sanguine-osseous; and finally, in the best examples of enamel, a distinctly crystalline body.

Were it not that the supply of material for each tissue or body must come through the primal sea of mucus mass, (nerve mass,) we could have no mobility as a continuous condition of the body as a whole; for with-

out this constant fresh supply, each tissue must hasten toward the most distinctly differentiated body, (enamel,) and thus become unyielding as granite, to the exclusion of the influx of the finer and indifferent "*primum mobile*," the only efficient cause of continued nutrient activity in any tissue, whether fluid, soft, or hard; vividness of action always being commensurate with the elasticity, fluidity, and clarity of the tissue or body in which the act is pronounced.

Thus we discover that which we denominate *original* temperament is *acquired* a little at a time, arrest of evolution constituting original differences of temperament in the same race. For if it be true that the original vesicle holds within itself all possible perfectibility of temperamental endowment, we see plainly that circumstances of the nutrient conditions alone constitute perfection or imperfection in its expression.

If we take a survey of the lower forms of life and being, we may readily discover that Class, Order, Genera, Species and variety are all differentiated by circumstances of perfection or imperfection of the stages of evolution and nutrition, in accordance with or discordance to the general and special plan of the archetypal proportions that are ever ready to express themselves in complete or fractional manifestations as they may find conditions to favor the enterprise.

Thus, Annelida may have nervose, dermal, and vascular temperaments, as a tribasic origin for the modifications of temperament possible to them; while the Crustacean attains to the lowest expression of the osseous, leaving the crystalline to be displayed for the first time in the vertebrata, in the highest types of which the perfection of differentiation of tissues in a single system is alone simultaneously pronounced. Here in this most complicated correlation of tissues and organs we meet with the greatest variety and imperfection of predominance of tissue and temperament.

The lower any being is in the scale of endowment of tissue and temperament, the less is the liability to deflection from a direct line of differentiation and nutrient support; and hence when it is deprived of a fraction of its body, its whole nutrient energies may be directed to a reproduction of the lost part, which soon attains useful proportions and consistency.

This is the prophecy and the promise that even the highest shall do likewise, so soon as the same absolute spontaneous obedience to instructional law shall find means of as complete dominion of the whole system.

That which is called acquired temperament, is either a further evolution of the complete round of the original intent, or a retrogression toward the dominion of the earlier states of development.

Instance the exquisite sensibility and nervousness manifested by him who had been most unsusceptible, hard, and stoical before pathological conditions set in!

This proves that disease may be deoxidation, or carbonization of the tissues, running them back through the stages toward mucus mass, anal-

ogous to the steps taken from that condition to the different degrees of organization, only in an inverted direction. We are now able to perceive that temperament properly lays at the very base of all organization and disorganization, and indicates the states of health and disease in quality and quantity, vindicating the paramount necessity of its more careful study, elimination, and codification, in distinct aphoristic statements, to enable us to coincide with the grand benevolence of the plan instituted, by obedience to which, the most instant and complete, we alone can attain the wholeness and perpetuity of life involved in temperamental endowment.

NEW YORK, January 13, 1864.

PRACTICAL LESSONS IN APPLYING ARTIFICIAL TEETH TO RUBBER BASE.

BY ALEX. M'KIRGAN.

I do not recollect of ever having seen any thorough instructions in any one article that could be followed successfully in making vulcanite work. In default of which, to the novitiate, numerous accidents and failures beset his path, until by actual experience he has acquired the necessary knowledge. To such a few words of instruction might be given to their advantage.

As the source of failure in many cases is the result of faulty impressions, perhaps it would be well to give a hint or two as to the best method of taking them. Either wax or plaster can be used for that purpose, and for partial sets gutta-percha is sometimes used, which must be filled immediately after the impression is taken, as it shrinks rapidly in cooling. If taken in plaster, either for full or partial sets, care should be used, when there are teeth remaining in the mouth, especially if much irregularity exists, to take the impression from the mouth before the plaster has fully set, say when the fracture of the plaster, if any takes place, will be sharply defined. These can be easily placed in their proper position, and fastened with shellac or sandarach varnish.

In order to secure a good impression, where the palatine arch is deep, or where there are teeth remaining in the mouth, put a border of wax on the back part of the impression cup, and take the impression while the wax is soft.

Next varnish the impression with shellac varnish, as it makes a deeper stain than sandarach, making a better guide when cutting the impression from the model. After the varnish has dried, oil it with a thin coating of olive oil. Make a thin batter of plaster of Paris and fill the impression. After the plaster has hardened, separate the impression from the model by careful cutting.

Mark the exact position you wish your air chamber to occupy on your

model. Mix some plaster, very thin, and with a spatula carefully make your chamber. After it has thoroughly set, trim it down to the required thickness; a sixteenth of an inch will answer. Next mark on the back part of the model the position the finished piece of vulcanite is to occupy in the back part of the mouth, starting from the depression in the palatine arch to the depression on the opposite side; cut this out about a sixteenth of an inch deep, beveling toward the air-chamber.

This plan is invaluable when a faulty impression of the back portion of the mouth has been taken.

(If it is found, upon trying the finished piece in the mouth, that there is too much rubber, then it can easily be cut or scraped away, always insuring a perfect fit in that portion of the mouth.)

Now take a piece of sheet gutta-percha, large enough to cover the space the vulcanite is to fill, place it into hot water until it is sufficiently soft to press easily into all the irregularities of the model. If any portion of the gutta-percha did not fit the model, you can place *that* portion with the model in the hot water, allowing it to remain a moment or two, when you can easily press it into place.

Care should be taken to get an accurate fit of the gutta-percha plate, as in partial sets it will make a serious difference in the success of your work. Try the plate in the mouth; should it not set snugly to the gums in front, occupied by the incisor and canine fossa, pare a little from your plaster model until it does. Attach a border of wax to the portion of plate intended to be filled with artificial teeth, and get your articulation. Grind and place your teeth in position on your plate. After trying them in the mouth to assure yourself of their correctness, place them upon your plaster model. Melt beeswax on the border to bring the gums to the proper thickness, and on the palatine arch to cover the impression of the air-chamber, then trim the wax to nearly the thickness you wish the finished piece to be, allowing a little for finishing up. Take the model and place it in water for a few minutes to absorb all the water it will. Mix a thin batter of plaster, and pour the lower portion of your flask partly full, and place your model in it; place the upper portion of your flask on the lower end, force down the model until the cutting edges of the teeth are a little below the upper portion of it; take off the upper portion and pare your plaster to the surface of the lower half. After it has set sufficiently, varnish all the plaster exposed with sandarach or shellac varnish. When dry, oil every portion excepting the teeth, which should be left untouched, as it is necessary that the plaster should adhere to them. Place the upper portion of the flask in position. Mix some plaster of the consistency of cream, and pour carefully over the teeth, occasionally tapping the flask, until it is a little more than full; as soon as the plaster begins to thicken, place the lid on, and force it quickly into place, and clamp it down. After the plaster has hardened, apply a gentle heat to

the flask, until you think the wax and gutta-percha have softened, when you can unscrew the flask and carefully separate the parts. Take the gutta-percha and wax off the model and from around the teeth. Make a channel in the plaster around the outside of the teeth next the flask, and channels leading to this, every quarter of an inch, to carry off the surplus rubber. Cover the model with a coat of Barker's Ethereal Preparation, and subject portions of the flask to a gentle heat.

Continue the heat on the upper portion until the most of the wax remaining on the teeth is absorbed; if any remains, it can be easily removed by a pledget of cotton. Heat up the lower portion of the flask very slowly, as if steam is generated too rapidly, the model is liable to be blown out and irreparably injured. Do not heat the portion containing the teeth too much, as it will burn the rubber, making it porous. Cut your rubber into strips, and these into blocks about a quarter of an inch square, and pack closely around the pins of the teeth; long strips can be used to form the gum.

That forming the roof may be cut in one piece. After the surface has been covered, place a piece, about an inch square, in the central portion of the palatine surface. It is better to have a little surplus than any deficiency. A very good guide is to have your gutta-percha plate, with the wax border attached, before you, and use your rubber until you have a corresponding amount packed in. Heat up both portions of the flask, until the rubber is soft enough to press into all the irregularities of the model upon the application of the clamps; being cautious about burning the rubber, which you are liable to do around the teeth. Place the two parts together and clamp them down. Should difficulty be experienced in bringing the parts together, which must be done cautiously, as there is liability of cracking the teeth if much pressure is applied, you can place the flask in hot water, and allow it to boil a few minutes, when the rubber will be softened sufficiently to screw the parts together without difficulty. Always screw the two portions of the flask together perfectly, as in partial sets it will make a great difference in the position of the teeth. Your cases are now ready for the vulcanizer. (I use Whitney's No. 2 Vulcanizer.)

Put your case or cases into the boiler of the vulcanizer, just covering them with boiling water. Screw the lid on the vulcanizer and apply the heat. Heat up gradually, taking about an hour for the thermometer to reach 290° , where it should be allowed to remain three-quarters of an hour; then raise it rapidly to 310° , allowing it to remain at that point until the whole time it has been subjected to heat reaches two hours.

This plan of procedure gives me better satisfaction than any other I have tried, giving the proper elasticity to the plate without warping, as is often the case if the plate is vulcanized too much.

Sometimes there is a difference in the rubber, some lots requiring a

little more time to vulcanize than others; fifteen minutes will usually be sufficient difference; and the same process can be carried out, excepting to keep the heat at 290° fifteen minutes longer, before raising it.

In grinding off the surface rubber, I use a large burr attached to my lathe, which cuts it away rapidly; then, with proper scrapers and files, I smooth the work for the sand-paper, using fine emory-paper first, until the surface is smooth, and then the finest of sand-paper, until I get a proper surface to polish on. Then use a middling hard brush attached to your lathe, and pumice-stone mixed in oil; and finally, finish with either a felt or cotton wheel, and finely powdered rotten-stone.

GREAT CENTRAL FAIR.

Additional contributions :—

Horn & Ellis, Philadelphia, Pa.....	\$25 00
W. & J. Jamieson, Glasgow, Scotland.....	61 33

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

BY GEO. W. ELLIS, M.D.

THE Association convened at Grant's Hall, Niagara Falls, on Tuesday, July 26, 1864, and was called to order at 11 o'clock A.M., by the President, Dr. W. H. Allen; Dr. J. Taft officiating as Secretary. Upon inquiry, it was found that two members of the Committee of Arrangements were absent, when Drs. Sill and Fitch were appointed as substitutes, to act in connection with Dr. S. B. Palmer. The credentials of delegates were then received, registered, and the following report, presented by the committee, adopted :—

Philadelphia Dental College.—Dr. J. H. McQuillen, Philadelphia, Pa.

Society of Dental Surgeons of the City of New York.—Dr. Geo. S. Allan, Newburgh, N. Y.

Odontographic Society of Pennsylvania.—Drs. A. B. Robbins, Meadville, Pa.; G. W. Ellis, Philadelphia, Pa.

Iowa State Dental Society.—Drs. W. O. Kulp, Muscatine, Iowa; A. P. Sayles, Lyons, Iowa.

Brooklyn Dental Association.—Drs. Saml. Hassell, John Allen, C. P. Fitch, W. H. Atkinson, A. C. Hawes, W. H. Allen, New York, N. Y.; F. N. Seabury, Providence, R. I.; J. H. Smith, New Haven, Conn.

Western Dental Society.—Drs. W. W. Allport, S. P. Abell, L. P. Haskell, Chicago, Ill.; H. E. Peebles, A. M. Leslie, Isaiah Forbes, C. W. Spalding, St. Louis, Mo.

Massachusells Association of Dental Surgeons.—Drs. I. J. Wetherbee, Boston, Mass.; H. F. Bishop, Worcester, Mass.

Ohio Dental College Association.—Drs. M. Decamp, Mansfield, Ohio; W. P. Horton, Cleveland, Ohio; J. C. Dean, Chicago, Ill.; H. E. Peebles, Jas. Taylor, H. Barron, A. M. Leslie, St. Louis, Mo.

Chicago Dental Society.—Drs. E. A. Bogue, J. Ward Ellis, S. B. Noble, Chicago, Ill.

Indiana State Dental Association.—Dr. J. F. Johnson, Indianapolis, Ind.

Mississippi Valley Dental Association.—Drs. Geo. F. Foote, Cincinnati, Ohio; J. Chesebrough, Toledo, Ohio; S. Driggs, Lexington, Ky.; H. McCollum, Augusta, Ky.

Central New York Dental Association.—Drs. L. A. Rhodes, Norwich, N. Y.; W. C. Orcutt, Jordon, N. Y.; C. F. Campbell, C. H. Foreman, Syracuse, N. Y.; L. Matson, Auburn, N. Y.

New Haven Dental Society.—Drs. C. Longstreth Smith, Elias Strong, J. T. Metcalf, New Haven, Conn.

Connecticut Valley Dental Association.—Drs. L. D. Shepard, Amherst, Mass.; J. McManus, Hartford, Conn.

Pittsburg Dental Association.—Dr. C. Sill, Pittsburg, Pa.

St. Louis Dental Association.—Drs. W. A. Jones, W. N. Morrison, W. H. Eames, St. Louis, Mo.

Northern Ohio Dental Association.—Drs. S. P. Huntington, Painsville, Ohio; L. Buffett, Cleveland, Ohio.

Western New York Dental Association.—Drs. J. G. Barbour, Le Roy, N. Y.; B. T. Whitney, Buffalo, N. Y.; A. G. Coleman, Canandaigua, N. Y.; J. Naramore, Rochester, N. Y.; L. D. Walter, Lockport, N. Y.; E. L. Wood, Brockport, N. Y.

Buffalo Dental Association.—Drs. Theo. G. Lewis, Geo. E. Hayes, Geo. B. Snow, B. S. Brown, Buffalo, N. Y.

Michigan Dental Association.—Drs. C. B. Porter, Ann Arbor, Mich.; H. Benedict, Detroit, Mich.; G. W. Stone, Albion, Mich.; L. C. Whiting, E. Saginaw, Mich.

Cincinnati Dental Association.—Dr. P. Knowlton, Cincinnati, Ohio.

Hudson Valley Dental Association.—Drs. L. C. Wheeler, S. D. French, Troy, N. Y.

Pennsylvania Association of Dental Surgeons.—Drs. B. M. Gildea, Harrisburg, Pa.; T. McCuen, Meadville, Pa.

Pennsylvania College of Dental Surgeons.—Dr. T. L. Buckingham, Philadelphia, Pa.

Merrimack Valley Dental Association.—Dr. E. G. Cummings, Concord, N. H.

Albany Dental Association.—Drs. B. Wood, J. A. Perkins, Albany, N. Y.

The following permanent members were present, having previously served in the capacity of delegates, but not representing any particular local Society at the present session:—

Drs. A. Blake, A. E. Lyman, S. J. Martin, J. C. Whinnery, J. Taft, C. E. Francis, P. Harris, S. B. Palmer, A. W. Allen, and W. A. Pease.

The following permanent members and delegates, who were not able to be present in person, forwarded their dues:—

Drs. W. K. Brenizer, Reading, Pa.; J. Foster Flagg, Thos. Wardle, R. J. Hoffner, Philadelphia, Pa.

The minutes of the last annual meeting were read and adopted.

The following resolution was then offered by Dr. Spalding:—

Resolved, That all dentists, residents in this vicinity, and others who may be in attendance during the sessions of this body and not members of or delegates to the Association, be hereby invited to take seats in the meeting. Carried.

The Nominating Committee, consisting of one delegate from each local society represented, then convened, and, after a short deliberation, submitted the names of several candidates for each office in the gift of the Association.

The hour being rather late, it was, upon motion, determined to postpone the election until the afternoon session.

Adjourned.

FIRST DAY.—*Afternoon Session.*

Reassembled at four o'clock P.M. Minutes of previous session read and approved.

The following was offered by Dr. Allport:—

Resolved, That the morning session commence at nine A.M. and continue until two P.M.; the afternoon session begin at eight P.M. and continue until adjournment. Carried.

The election of officers being in order, Drs. Palmer and Benedict were appointed tellers.

The names of the several candidates being announced from the Chair, the balloting proceeded, resulting in the unanimous selection of the following gentlemen to their respective positions:—

President.—Dr. J. H. McQuillen, of Philadelphia, Pa.

1st Vice-President.—Dr. C. P. Fitch, of New York, N. Y.

2d Vice-President.—Dr. H. Benedict, of Detroit, Mich.

Corresponding Secretary.—Dr. Geo. W. Ellis, of Philadelphia, Pa.

Recording Secretary.—Dr. J. Taft, of Cincinnati, Ohio.

Treasurer.—Dr. I. J. Wetherbee, of Boston, Mass.

Drs. Spalding and Taylor were appointed a committee to conduct the President elect to the chair, who, upon assuming the position, re-

marked that he heartily thanked the Association for such manifestation of kindness and confidence, but wished it might have fallen upon some one better qualified than himself by age and experience in parliamentary usages. He could truly say that he had never aspired to such a position, and had ever felt that the *honor* usually attached to its occupancy was far *less* than that commanded by an *earnest, efficient worker* in such an organization. He referred to the fact that, five years since, the small band of delegates, which assembled in *Convention* at NIAGARA, for the purpose of taking into consideration the expediency of forming this body, met under very adverse circumstances, but at the present session, was happy to say it assembled not only large in numbers, (88 delegates,) but also with the hearty co-operation of the profession. At first it had been misunderstood by some, misrepresented by others, and stigmatized as an exclusive and aristocratic movement, and much opposition offered to its progress. Unmindful of this, the organization had moved steadily forward, *doing its appointed work*, and thus gained a firm hold on the *confidence*, as it had *commanded the respect* of the profession. He had never *opposed* any organization, although admitting that circumstances had induced him to withdraw from some when he had lost all interest in, and desire for affiliation with them. He could only work where his convictions of duty prompted him to labor, and when his heart was in the cause; when not actuated by such incentives, deemed it far better to be out of, rather than stand idly in, the way of others. He expressed a strong advocacy of, and a firm reliance in, a National Association upon a representative basis, and believed that it was in the power of such an organization to do more toward advancing the great interests of the profession, educational, literary, scientific, and practical, than any other means which could be employed. It could not assume to *dictate* terms to the profession, but the *recommendations*, emanating from a body composed of delegates from local societies established in every section of the country, would carry with it a *moral* force which would be overwhelming and irresistible. He closed by again thanking the Association for the kindness manifested to him personally.

The retiring President, Dr. W. H. Allen, was then called upon for some remarks. In responding, he gave a short synopsis of the origin and progress of the Association up to the present time, and spoke of the encouraging prospect presented. He invited each and every one to place his shoulder to the wheel of progress, and contribute his mite in assisting its onward course; strife, so far as an effort to excel in so noble a work, he would commend, and instanced the healthy stimulus provoked by the organization of local societies. He regarded association as the cultivator of mutual regard and respect, and the best antidote against the prevalence of slander and ill feeling. In closing, he bid the Association and its individual members God-speed!

Upon motion, the address was referred for publication.

A letter was received from Dr. Geo. Watt, an active and prominent member, now serving his country in the capacity of surgeon of one of the Ohio regiments in the field. It was read by Dr. Allen, and contained a strong expression of sympathy with the Association, regret at his inability to attend, and breathed that patriotic spirit which alone will command the respect and admiration of all reputable, loyal, and law-abiding men.

A letter from Dr. J. Foster Flagg was read by Dr. Ellis, in which he stated that he had resolved to attend the meeting, and had perfected all arrangements for his departure, when intelligence of death in the family compelled him to remain. He expressed a warm interest in the welfare of the organization, and wished them a harmonious and profitable session.

Upon motion, these letters were referred for publication.

The Treasurer reported no balance of funds remaining from last year.

Drs. Allen and Buckingham were appointed a committee to audit the account, which they found correct, and reported accordingly. The report was adopted and the committee discharged.

A suspension of rules was voted, for the consideration of the constitutional amendments proposed at the last session by Dr. Watt, viz.: In Art. 5, Sec. 1, strike out "1 from each delegation" and insert "9 members appointed by the Association;" also strike out the word "plurality" and insert "majority."

Considerable discussion followed, and the amendment was finally adopted.

Dr. McQuillen, chairman of the committee to ascertain the feasibility of having dentists appointed to the military hospitals of the United States, reported that he had written to Surgeon-General Hammond, but without obtaining any reply. He recently addressed a letter to Acting Surgeon Barnes, which met with an unfavorable response; yet he did not feel discouraged, but thought that the importance of the subject, together with the obstacles interposed against its successful accomplishment, ought to prove but as stimulus for additional and more vigorous efforts. The report was adopted and the committee continued.

Dr. Shepard gave a very interesting account of some efforts which he had recently made to obtain a permit that might enable him to visit a regiment in the field, a number of whose officers desired his services; they had all proven unsuccessful in consequence of the impossibility of obtaining the indorsement of the Surgeon-General; but finally, the colonel regarding the regiment as his special domain, promised him protection independent of such indorsement. Thus assured, he went and remained some time, and could speak positively with regard to the demand for competent dentists in the army. He advocated an independent movement upon the part of the profession, such gentlemen as desired to

go first obtaining a permit from the governor of the State in which they reside, which would be all that is requisite to insure their admittance among the troops coming from that State.

By request of the Association, Dr. S. S. White stated that, circumstances favoring, he had spoken to President Lincoln upon the subject, asking his advice as to the direction in which efforts should be made to secure for the soldier such attention to his teeth as might be necessary to preserve his efficiency. The President said that it might be well to call upon the Secretary of War, who would probably refer to the Acting Surgeon-General. He called at the War Department, but the Secretary being absent, waited upon Acting Surgeon-General Barnes, who stated that the attention of the department had been called to the subject, and had received due consideration. The conclusion arrived at was that nothing could be done while the armies were in active operation. If the war should last until winter, and the armies go into winter quarters, something could probably be accomplished. In that event the department would be pleased to be addressed upon the subject by the committees appointed to further the object. Stated that legislation by Congress was not necessary, the Medical Department being competent to make the requisite regulations.

Dr. Taylor thought that one-half of the services rendered by a dental practitioner would be of such an expensive character, that the government would feel unwarranted in assuming such a great additional expense; yet there is much suffering which can be relieved by dentists only. He therefore advocated medically educated dentists entering the army as surgeons or assistant surgeons, and no one should be admitted in such capacity unless provided with some evidence of a dental education. He contended strongly for the position of equality with the medical profession, which our present standing unquestionably warrants.

Dr. Shepard said that an assistant surgeon or surgeon could receive no remuneration for dental services.

Dr. Taylor thought it hardly reasonable that the government should be expected to remunerate the dentist, and here the greatest difficulty arises.

Dr. Fitch threw all the opprobrium of opposition to this humane movement where it should rest, upon the medical profession. He liked the plan suggested by Dr. Shepard, of going independently under gubernatorial indorsement.

Dr. Forbes advocated memorializing Congress, thereby meeting and defeating the medical profession upon fair open ground. He believed that in a short time, professional appointments to the army would be one grade higher, demanding, as a qualification, that the applicant be not merely a surgeon, but in addition a surgeon dentist. He contended that the delicacy and precision of the manipulations of the dentist were such as

to render him, when provided with a medical education, more competent to discharge the duties pertaining to the post of surgeon than that officer himself.

Dr. Spellman thought that should dentists receive appointments to the army, the salary would be so limited as to offer no inducement to good operators, consequently the presence of inferior men, together with the low perquisites of the office, would place the dental in a position at once inferior and subordinate to that of the medical profession. He advocated independent and individual effort upon the part of those desiring to alleviate the dental sufferings and ailments of the soldier.

Dr. Bogue said there was an important point in connection with this subject which seemed to have been overlooked; he referred to the capability of the dentist in treating fractures of the maxillary bones.

Dr. Wetherbee alluded to the necessity of having the six front teeth to bite the cartridge, in order to pass and secure a surgeon's certificate for admission into the service, although numerous roots which may prove more destructive to his comfort than rebel bullets, are entirely overlooked. He thought a reform should be instituted in this direction, and the examination of the teeth extended farther back than the cuspids. He spoke of the universal ignorance of the medical profession in relation to the dental organism; and in order to secure to the army the advice and services of competent dentists, he would advocate independent action by able and worthy men under the approval of the medical department.

Dr. Allport advocated the plan proposed by Dr. Shepard, of independent action under authority derived from the governors of the several States.

Dr. Fitch advocated memorializing Congress upon the subject, and acting irrespective of the support and influence of the medical department.

Dr. Spalding thought there were but two ways of reaching the matter: either by the establishment of a dental bureau, or by independent action.

Dr. Spellman advocated congressional action, to empower governors to send such dentists as they may deem proper.

Dr. Kulp suggested that the advocacy and influence of the army be enlisted.

Dr. Shepard regarded it a godlike mission to practice for the relief of the soldiers, the credit being none the less on account of the remuneration received, for they were appreciative and willing to pay liberally for the services rendered.

Dr. McQuillen said that the subject was the introduction of dentists into the military hospitals, and not into the army, as seems to have been apprehended. In his association with members of the medical profession, he had never been met with that antagonism and hauteur which had

been complained of. He mentioned a case of fracture of the inferior maxilla, at the symphysis, which he had at present under treatment.

Upon motion, adjourned.

SECOND DAY.—*Morning Session.*

Called to order at half-past nine o'clock A.M. Minutes read and approved.

The Chairman of the Committee on Publication reported that 250 copies of the Transactions had been published, part being bound with former proceedings, and part alone. The expenses of their issue were more than covered by the receipts for copies sold, some thirty numbers yet remaining for disposal.

Upon motion, the report was accepted.

The Committee on Prize Essays had no report to offer.

Dr. Spalding offered the following resolution :—

Resolved, That the thanks of the Association be tendered to the officers of the past year, for the able manner in which they discharged their duties. Carried.

Dr. Wetherbee moved that reporters of the press be invited to attend. Carried.

Dr. Taylor offered the following :—

Resolved, That members of the medical profession, who may be with us during our session, be invited to participate in our discussions.

Dr. Spalding amended, that they be invited simply to be present. Carried as amended.

The report of the Committee on Dental Pathology and Surgery, prepared by Dr. J. Foster Flagg, was read by Dr. Ellis. He lamented that the department of disease and therapeutics was so sadly undeveloped; yet regarded the success attendant upon our efforts for the alleviation of suffering and restoration to health, sufficient to warrant hopes of rapid future advancement. In the consideration of pathological questions, he advocated a simplicity of terms, and a dealing with basal principles, rather than tangible or intangible hypotheses. He defined "Physiology" as the science of normal nutrition, "Health" being the result of such nutrition; "Pathology" as the science of perverted nutrition, and "Disease" the result of such perversion. He defined the principles and practice of dental surgery "as consisting of such application of general facts relating to diseased conditions, and such statement of the treatment deduced therefrom, as may be subservient to the requirements of dentistry." He described, at some length, inflammatory action, from its inception through its various stages, to its termination by either resolution or suppuration. He contended for the importance of demonstrative pathology, and deprecated the practice of leading the student into the mazes of

theory and quicksands of speculation. He gave the peculiarities of Determination, Congestion, and Suppuration, their location, and the methods of treatment severally applicable. He recounted the requirements necessary to constitute a good practitioner, reviewed with pleasure the vast array of suffering and disease which, as dentists, we are at present able to promptly and certainly relieve, and looked with complacency upon the niche which is filled by that pathology upon which is based the principles and practice of dental surgery.

Dr. Atkinson, a member of this committee, also presented a report, in which he opened by referring to the intricacy and ambiguity of pathology, and the necessity of understanding physiological activity, by the examination of living bodies, in order to comprehend its teachings. He described what constitutes pathological changes, and gave a summary for the treatment of different lesions, dwelling particularly upon the importance of excluding oxygen from diseased surfaces. He gave a somewhat minute and lengthy dissertation upon cellular pathology. He said that the satisfaction of type with habitat is the true measure of physiology, and any dissatisfaction here, lays the foundation of and becomes pathology. At the close of his report, he remarked that cells are the offspring of a power from without, and dependent upon it for existence, their first action being a sense of need or aspiration. He said that the desire for knowledge is the true key to progress; and spoke of the force of combined effort.

Dr. McQuillen said that no fact in science, he considered, had been more clearly demonstrated, by an eminent German physiologist and pathologist of the present day, than that *a cell is incapable of self-generation*.

Dr. Chesebrough read a paper on "The Liability of Adult Teeth to decay in the United States, with Comparisons between English Hospital and American Office Practice; also a Tabular View of the relative ratio between the extreme West and Middle of the United States north." He alluded to the frequency of such questions as, Why do my teeth decay so fast? I take good care of them; or which teeth are most likely to decay? He said that the liability to decay is much greater upon this side of the Atlantic. The great difference between the statistics of himself and those of Dr. Tomes, is accounted for by the fact that his observations were confined to private practice, while the investigations of the latter gentleman were conducted in hospital practice, where the injurious influences of improper food and luxurious living were not made manifest. He believed that the first molars, when decayed, would contaminate the adjoining teeth, and regarded them as the keystone of the arch. Preserve them, and you will perchance preserve all; lose them, and likely all are lost. He had found that the liability to caries in the female over the male existed only in the six front teeth, the others being about equal. His tables had been com-

piled in the Cities of Davenport and Toledo, the two furnishing about the same results.

The paper was referred to the Publication Committee.

It was moved to tender Dr. Chesebrough a vote of thanks, in view of the great amount of time and labor expended in the preparation of such full and valuable statistics. Carried.

A paper from Dr. Marshall, of Delaware, on the "Treatment of Sensitive Dentine," was read by Dr. Taft. He referred to and deprecated the use of arsenic. Thought it cruel to rely upon the sharp excavator alone, and called attention to a preparation which he had used with success.

His communication was laid upon the table.

Adjourned.

SECOND DAY.—*Evening Session.*

Called to order at a quarter past eight P.M.

The Secretary being absent, Dr. Ellis was appointed Secretary *pro tem*.

Dr. Spalding said that it was stated by Dr. Atkinson that what is true of one cell is also true of an aggregation of cells; he would go farther, and say that it is true of the entire human economy, for he contended that what is true of particulars is also true of generals, and *vice versa*.

Dr. Buckingham thought the position untenable, believing that the cells of different organs differ, and called attention to the fact that cells are formed having functions different from those which originate them.

Dr. Shepard related the case of a lady, about forty years of age, who had an abscess, which formed during an attack of ague, and had been discharging into the mouth for some weeks. He discovered the fistula at the vacancy left by the extraction of the bicuspid; this he opened, and also the old one over the socket of an extracted lateral. Upon syringing, the tepid water passed directly through. As he was about leaving for the Association, he was obliged to postpone the treatment until his return, and he would now be indebted for any suggestions that might be offered.

Dr. Wetherbee gave a description of a case, discharging a very offensive pus at the point of the first bicuspid. He discovered an extensive abscess, which he opened from the incisor to the molar, also upward toward the lip and inward over the palatine arch; syringed, removed the necrosed bone, except at the bottom of the cavity, which he scraped; and by the use of a detergent wash succeeded in effecting a cure. He described a similar case, which originated from the root of a left canine. The parts were freely opened as before, the necrosed bone removed, and the case brought to a successful termination.

Dr. Pease read a paper on "Reosteogenesis," in which he stated that by this means many comparatively useless teeth were rendered valuable, and the necessity for artificial work sensibly diminished. He considered the waste and deformity occasioned by extraction objectionable, and in

the treatment of an abscess regarded the tooth as a valuable adjunct in acting as a support, and its removal curative only from the stimulus of the shock, a result which might be easily accomplished independent of such a sacrifice. He instanced diseased teeth, bad treatment, syphilitic taint, etc. as causes of disease of the bone, and mentioned the purplish gum, loose tooth, and presence of pus at the margin of the gum, as the prominent indications of necrosis. He described the peculiar appearance of necrosed roots when exposed by incision of the gum. He would not use chlorine-water in the treatment, being fearful of injury to the bone, but depended upon creosote, iodine, etc. either alone or in connection with some vehicle, such as glycerin. Described the case of A. B., about forty years of age, weak constitution, with a very fine fistula between the lateral and central, of ten years' standing, which was opened, exposing a large abscess. This was syringed with iodine, glycerin, etc., the roof of the mouth supported by astringents, while sarsaparilla and hydriodate of potash were administered internally. The patient was improving, but a short absence restored the old condition. Upon resumption of the treatment, however, the greater part of the bone was reproduced. He remarked that the new-formed bone has very low vitality, and should be well and carefully protected. Said that the treatment of abscess is of greater difficulty in the superior than in the inferior maxillary. Spoke of a case of necrosis of the intermaxillary bones which had been cured. He had met with a case of phosphor-necrosis of a portion of one side of the jaw, which proved quite tractable.

The paper was referred to the Publication Committee.

Dr. Benedict described the case of a lady, about twenty years of age, who called with toothache. He made a hasty application to destroy the pulp. In ten days she returned with a badly swollen face; the tooth was removed, and a disease of the antrum disclosed, which he treated with tincture of iodine and creosote, and, although somewhat tedious, is now almost entirely well.

Dr. Fitch spoke of the danger of *over-treatment*, and the necessity of understanding when and when not to interfere. The subject of pathology he regarded as intricate, and any one who would desire to understand it, should first obtain, so far as practicable, a thorough knowledge of the physiology of the cell. He did not regard the periosteum as the only bone producer. If it be desirable to reproduce structure, healthy action must first be established, and a pocket retained for the support of the plasm. He described nutrition as an equilibrium between appropriation and disappropriation. He thought diseases of the teeth as amenable to treatment as their salvation from caries is practicable by the operation of filling.

Dr. Pease described a case where the whole outer plate of the superior maxillary was gone clear up to the base of the *alæ* of the nose; this was reproduced, forming from above downward. He regarded the periosteum as the only bone-producing agent.

Dr. Taylor believed that cells reproduce each other. He mentioned the reproduction of the alveolar border, which had been effected in his own mouth. For this purpose he employs the tincture of iodine, and believes that under such circumstances a plasm containing the bone cells is exuded and afterward organized. He thought it important in these cases to exclude all foreign matter, by filling the tooth, there being but little danger of inflammation following the operation, on account of the lower organization of the surrounding structure. Thought it an interesting fact in the case related by Dr. Shepard, that so large a cavity should have existed without perforation of the antrum. He described a case in which two superior bicuspid had been broken off; an abscess followed, opening over the lateral, occasioning in six weeks the loss of twenty-seven pounds of flesh. Upon examination, a bicuspid root was discovered as the offending cause, removed, and an injection of 10 gtts. of creosote to a tumbler of water thrown in every alternate day, with the result of almost entirely arresting the discharge in the space of seven days; iron and other tonics being constitutionally administered, and occasional topical applications of iodine being resorted to.

Dr. Horton mentioned the case of a little girl, six years of age, where necrosis of a considerable portion of the maxilla resulted from an attack of small-pox; recovery followed with but little treatment. Referred to the case of a candy manufacturer, of strong, well-knit frame, and perfectly developed dental organs, which unexpectedly yielded to very slight force employed for their removal. He wondered whether the occupation could have occasioned this result. Also related the case of an old gentleman, who had an upper molar filled some years since, which remained comfortable for a long time, but suddenly commenced to give trouble, that necessitated its extraction. These cases were noticed as being of interest in connection with the subject of pathology, and the specimens presented for investigation.

Dr. Forbes spoke of Hunter's experiment of transferring a tooth to the comb of a cock.

Dr. Atkinson thought that in this case the partially developed tooth had its remaining pulp intact, and was by anastomosis enabled to complete the formative process. He mentioned the case of his brother, from whom a tumor had been removed, the dissection of which revealed bone that had been formed *de novo*. He regarded periosteum as nothing more than condensed cellular tissue acting as a wall between hard and soft tissue, calcification being effected by the deposition of lime salts within the plasm. In his treatment of tertiary syphilis, he exhibits protiodide of mercury and iodide of potassium internally, prescribing at the same time a steam bath; upon removal from which the patient is to be wiped dry and rubbed down with lemon-juice, followed by sweet oil.

Adjourned.

THIRD DAY.—*Morning Session.*

Called to order at nine A.M. Minutes read and approved.

Dr. McQuillen said that he had listened with much pleasure to the paper of Dr. Atkinson, and that the views presented were those entertained by some of the most prominent pathological writers of the present day. He then gave, as the generally accepted definition of physiology, that it is that science which treats of the actions or functions peculiar to living organized beings during the continuance of health or normal life. When these actions occur in a disturbed or irregular manner, they constitute disease or abnormal life, and become the subject of the science of pathology. He then referred to the fact that there was no such thing as *spontaneous generation*, and that all organized bodies have their origin in an egg or seed, and that there appeared to be no exception to the universality of the maxim of Harvey, "*omne vivum ex ovo*," and that the position assumed by Virchow, in his "*Cellular Pathology*," (a work which should be in the hands of every one who desires to understand this subject,) that "where a cell arises, there a cell must have previously existed, (*omnis cellula e cellula*)," seemed to be quite as tenable as that of Harvey's. Entertaining views such as these, he could not recognize the possibility of the formation of a tissue *de novo* from a structureless fluid, either as the result of physiological or pathological action, any more than he could admit the probability of equivocal or spontaneous generation in the animal or vegetable kingdoms. He did not regard *plasma* (*blastema* or any of the other names by which the fluid is called) as a *structureless fluid*, out of which *cells* are spontaneously formed; but that every cell found in the fluid was formed by a pre-existing cell, and is capable of reproducing its like. In other words, that each cell is born, lives, reproduces its kind, and dies. Each cell has a definite period of existence, and when the termination of that period has been reached, it is cast off; through the agency of the cells, the different tissues are formed and nourished, and the constant birth, life, and death of all the cells of an organism make up the sum of the activities which constitute the life of an organized being. He did not regard the periosteum as a bone-producing agent, but as a medium through which the *compact* or *laminated* structure of bone derives its nourishment; the periosteum being liberally supplied with blood-vessels, these send off capillary branches, which pass into the *Haversian canals*, and the *liquor sanguinis*, transuding through the walls of capillaries, passes along the *canaliculi* to the *lacunæ*, and is thus distributed to every part of the laminated structure; the medulla and medullary membrane, in the interior of the bone, serve as an internal periosteum to nourish the *spongy* or *cancellated* structure. In the reparation of bone, whether after *fracture*, *necrosis*, etc., the plasma may be furnished either by the periosteum, the medullary tissues, the bone itself,

or all combined, the blood-vessels of these tissues serving as conduits, conveying to the affected part the materials required, and the cells, as the real and active agents, effecting the reparation. He did not regard the formation of an abscess at the root of a tooth as due to the distention occasioned by the generation of mephitic gas; but believed that the gas served as an irritant to the periosteum, inducing inflammation and subsequent suppuration. Pus could not with propriety be considered a secretion, and the pyogenic, or pus-secreting membrane as it is called, is nothing more than the thickened periosteum. Pus he defined as dead exudation corpuscles, or *cells* floating in serum. Had these cells been formed in a healthy part, they would have served to repair the waste which is constantly going on in every part of the body; but developed under such peculiar circumstances, they fail to reach maturity, and therefore degenerate into pus corpuscles. In response to questions from Dr. Atkinson, he gave brief descriptions of *endosmosis* and *exosmosis*, and defined his views in relation to the origin and function of the cells.

Dr. Ellis believed that much of the difficulty of satisfactorily accounting for the variety of properties manifested by different cells, apparently similar in structure, could be best overcome by referring such variety not to any inherent power in the cell itself, but to its peculiar organization producing a modification of the nerve force passing through its substance. This is the doctrine advanced by the supporters of the undulatory theory of nerve force, which, in view of its simplicity and power of consistently explaining the greatest number of phenomena manifested in the human economy, is deserving of more attention than has yet been accorded it.

It is assumed that the sun is the centre or origin of all forces, which by ingenious argument are proven to be mutually convertible, and that the function of the vesicular neurine is to convert force, pre-existing in the blood, into what is recognized as nerve force, and which, as before stated, is modified according to the structure of the molecules through which it passes. This seemed to be a much more rational explanation than the assertion of the existence of an *inherent* force in each individual molecule, and forms the basis of that system of medication which addresses its remedies to the nervous system as the generator and conductor of normal and abnormal undulations, disease being traced to the latter as its *first* manifestation, calling for its modification or restoration to the natural condition, as the first and generally the only interference demanded. He would not be understood as an advocate of Homœopathy, for candor compelled him to admit his ignorance of the subject, which deterred him from pronouncing favorably or otherwise upon such practice; yet he would remark that he had read with pleasure and profit works published by its supporters, and would direct attention to "The Scientific Bases of Homœopathy," by W. H. Holcombe, M.D., as affording the clearest,

most interesting, and plausible explanation of the theory under consideration of any work that had yet come under his notice.

Dr. Fitch believed force resident in the cell, and of its origin we are ignorant, further than a knowledge of the broad fact that it comes from the Creator of all.

Dr. Chesebrough queried whether nerve force originates in the blood or nervous system, and inclined to the belief that it is derived from the arterial blood.

Dr. Atkinson described the four forms or grades of life in which the inherent force of organized beings is manifested, the other or sentient force originating from Deity. He defined force to be that which moves. He said that molecules, after obtaining inherent force, obtain power which enables them to appropriate more; these molecules, aggregated, forming tissues, and these together constituting systems.

Dr. Spalding said that the human body had been very truly termed a *microcosm*, or little world; an epitome of the *macrocosm*, or great world. He believed that matter possesses no inherent force, and although the solar force had been mentioned as the prime motive, yet back of that again is the source from whence all force originates.

Dr. Buckingham said that it was not possible to create matter without properties. He described the atomic theory, and spoke of the persistence of atoms once created, and the impossibility of converting one atom into another or one property into another. He said that life force must be derived from a parent and transmitted to offspring. We can form no conception of what *force* is; we are ignorant of it, and can only regard it as the infinite, for all our knowledge, strictly speaking, is the result of comparison. He did not think that the cell existed in the blood, but was produced by adjoining cells, the surrounding plasma constituting the nourishing material.

Dr. Pease read an addendum to his paper upon "Reosteogenesis," in which he said that it was not his desire to contend about terms; he wanted to employ them, however, and recognized their value only so far as they were available for scientific description. He stated that the pus in alveolar abscess is a liquid containing the broken-down tissue of the socket, and believed that for the cure of such cases surgical and medical interference were generally demanded. He said that the periosteum, which has fallen from the surface of the root, covers the bottom of the cavity formed by the loss of the alveolar tissue, and all medicaments designed for the reproduction of bone must be addressed to this membrane, or otherwise repair will be impossible.

Dr. Allport did not think the views advanced in Dr. Atkinson's paper new, for he had not regarded periosteum as the only structure capable of producing organizable bone plasm, but was aware that it had been wept out through the bony tissue itself; and instanced the experience of Dr.

Brainard in the treatment of ununited fractures, where union was effected by puncturing the ends of the bones, causing the effusion of plasm, which afterward ossified, effectually remedying the deformity. He mentioned the case of a young man in whom the removal of a tooth occasioned necrosis of the jaw, where, by an operation, the entire inferior maxilla was reproduced in six weeks. He believed that in such cases it was a spiritual force reclothing itself with matter.

Dr. Chesebrough described two cases—one in which two inches of the femur had been reproduced; and another, in which an interval of six inches, in the same bone, was gradually reforming.

Upon motion, the subject of "Mechanical Dentistry" was declared under discussion.

Dr. Foote described three instruments, invented by Dr. Scranton, of Bennington, Vermont, which singly possess all the advantages of the drill and excavator combined.

Dr. Spalding moved that the models be accepted and referred to the Publication Committee, and cuts of the instruments be prepared. Carried.

Upon motion, the discussion was suspended, to enable Dr. McQuillen, as a member of the Committee on Physiology, to perform some vivisections upon pigeons, demonstrating the functions of the cerebrum and cerebellum, in the course of which the insensibility of the former was made fully apparent by cutting away several slices with the scalpel.

Upon motion, he was requested to prepare a written and full report of the experiments, and his remarks, which will appear in the Transactions of the Association.

Dr. Horton mentioned the fact that, while upon a sporting excursion, he shot a bird, causing instant death. Upon examination, the only wound discovered was that occasioned by a No. 4 shot, which had passed directly through the heart. He had also killed a squirrel in the same manner; yet a rabbit, whose brains were shot out, lingered for some time. He asked for an explanation of this seemingly curious circumstance.

Dr. McQuillen replied, that life has been said to rest upon a tripod formed by innervation, respiration, and circulation. In the former instance one leg of the great tripod—the heart—was destroyed, causing instant death; in the latter case, the cerebrum and cerebellum alone were injured, the vital centre of the medulla oblongata escaping direct lesion. He referred to the fact that there were numerous instances on record in which human beings had lost portions of the brain without inducing fatal results, and mentioned, in particular, the case of a young lad who was regarded as a very stupid boy at school, until after a fall from a tree, in which he sustained a fracture of the skull and lost at the same time a portion of his brain. After recovering from this accident, he became quite as remarkable for brightness as he had been before for stupidity, and eventually rose to be Chief Judge of the Supreme Court of his native State.

Dr. De Camp mentioned the case of a fowl which had been injured during a combat, by a spur, which penetrated the brain; recovery, however, following so serious a wound.

Dr. Ellis mentioned the case of a medical friend who, in an effort to part two combatants, was struck upon the head with the handle of a shovel, inflicting a very serious wound, consisting of two direct openings into the cavity of the cranium, in addition to a stellated fracture extending nearly to the base of the skull. A portion of the brain protruded, and was afterward removed; and, although it has been some six or eight years since the injury was inflicted, the best medical and surgical talent has been fruitlessly expended in efforts to reproduce the lost bone; the parts continue to discharge, there also being a persistent, troublesome, and painful congestion of the eye which it is impossible to relieve. He mentioned the case to show that injury of the cerebrum will not necessarily prove fatal, even when so extensive, although an erroneous popular belief to the contrary prevails.

Dr. Shepard mentioned the case of a blaster who, while engaged at his occupation, was the victim of a premature explosion, which projected a large crowbar upward, causing it to enter under his chin and pass out at the summit of the cranium, carrying away a portion of the cerebrum. Notwithstanding the serious character of the wound, under proper treatment the case recovered.

Dr. Whitney mentioned the case of a man who was noted for his frivolity and profanity, and whom a fracture of the skull converted into a sedate, pious, and worthy member of society.

Dr. Allport related the case of a dog that was kicked by a horse, causing a fracture of the skull and protrusion of a portion of the brain, which was afterward removed. During the operation an inordinate quantity of chloroform was administered, with but very little effect. Subsequently, however, the dog recovered, when, upon a second administration of the anæsthetic, but a very small amount was found necessary to induce its full effects. He called attention to the fact as one interesting and valuable.

Upon motion, the consideration of "Mechanical Dentistry" was resumed.

Dr. Benedict believed that rubber had been so used as to bring obloquy upon the profession.

Dr. Perkins objected to the artificial look which rubber teeth invariably possess, and thought a reform in that direction loudly called for.

Dr. Fitch said that an effort to improve the appearance of artificial teeth and simulate nature more closely was now being made, by first obtaining impressions of the natural teeth and modeling these in moulds of brass. It was also designed to secure, if possible, that translucency which is so desirable. He thought that such endeavors should meet with the encouragement they merit.

Dr. Buckingham presented specimens of rubber which had been vulcanized without the admixture of coloring matter. He said that ivory or lamp-black would impart a black color, oxide of zinc a whitish hue, oxide of iron a dingy red, and the red sulphuret of mercury or vermilion the most desirable shade of red.

A paper from Dr. Bonwill, upon "Articulation and Articulators," was then read. He spoke of the too frequent introduction of imperfectly articulated work, dwelt upon the importance of perfect occlusion, and gave a lengthy description of his new articulator. The paper was referred for the decision of the Publication Committee, with authority to condense the same.

Dr. Buckingham mentioned a case of disease in the City of Philadelphia which had, by an eminent surgeon, been ascribed to a piece of rubber work, and very unjustly, as after-facts fully proved. He said that some rubber is very impure, and, in order to avoid poisons, we may return to rubber and sulphur alone. He thought the Rubber Company introduced the coloring matter by passing the rubber through hot rollers, with this sprinkled upon its surface. Dr. Wildman, however, dissolves the rubber in turpentine, then evaporates to a semi-fluid condition, mixes one part of sulphur to two parts rubber, with coloring matter sufficient to impart a desirable shade. The red oxide of iron had, with the exception of vermilion, given the most pleasing result. He said that the earthy matters used to neutralize the black color of English rubber injured its texture, rendering it soft and chalky.

Adjourned.

THIRD DAY.—*Evening Session.*

Called to order at a quarter past eight P.M. Dr. Fitch in the Chair. Minutes of previous meeting read and approved.

Dr. Wetherbee regarded mechanical dentistry as an open field, capable of great improvement. He said that it was the misfortune of some to be able to carve but one style of tooth, and never vary from their beaten path; while all are aware that the greatest variety is necessary, in order to closely imitate nature in structure, form, and color. He called attention to the following prominent and prevailing defects in artificial teeth: 1st. The front teeth are generally too flat upon the front surface, and too straight across the cutting edge. 2d. The canines are not quite long enough or full enough, particularly the gum. 3d. The first bicuspsids are too prominent. 4th. Defective coloring, which can be improved only by hand enameling. In the introduction of the first case, he swages a suction-plate, allowing the teeth, when adjusted, to enter the holes or sockets formerly occupied by the natural teeth. This generally lasts about six months. In the construction of the second set, he first trims his plaster model in all directions, so that the plate may fit close or prove a *little* too small; around the upper edge of the palatine arch is soldered a slight lip, which is gradually reduced (as the settling of the plate does away

with its necessity and occasions cutting) until it is entirely removed. He prefers wax for impressions, reintroducing several times, in order to insure perfection.

Dr. John Allen read a paper, in which he reviewed the many materials which had been derived from the mineral, animal, and vegetable kingdoms, as suitable for an artificial base. He referred to the liability of animal structures to decay, and objected to tortoise shell and horn, from the readiness with which they yield and bend upon the contact of heated food or drinks. He cited the advantages and disadvantages of rubber, and regarded gold and platina as probably the best, ranking palladium, alluvium, and tin as considerably inferior. The latter metal he thought very objectionable, from its unnatural appearance and tendency to tarnish. He thought that the brittleness of entire porcelain plates, together with the difficulty of securing an accurate adaptation, constituted objections to their employment. He believed that platina, although of itself too soft, would, when stiffened, as in continuous gum work, prove all that had been claimed for it.

The paper was referred to the Publication Committee.

Dr. Haskell said that some time ago he had constructed work for Dr. Wetherbee, and the remarkable uniformity of his models was proverbial. He had employed the lip, advocated by that gentleman, to great advantage. He referred to the deficiency of artificial teeth in shape and shade; regarded continuous gum work as superior to all others, and would say that, in his hands, it *very* seldom required repair.

Dr. Perkins pares the entire surface of the plaster model; was not aware that any one else did it, but was pleased to learn the fact. For impressions, he always employs wax, pure and yellow. Referred to the trouble of obtaining such shades of teeth as are most frequently required.

Dr. Wetherbee called attention to the following defects in lower teeth as generally manufactured: *First*. The teeth are too narrow, rendering the arch too contracted. *Second*. The lower bicuspidis are not bowed upon their outer face, so as to throw the grinding surface inward as far as desirable. *Third*. The cutting edges of the lower front teeth have not that slight inclination inward which is necessary for good articulation.

Dr. S. S. White, having been requested to make some remarks on this subject, said that while desirous of being brought to a recognition of his defects, he would very naturally prefer being told of them more privately; nevertheless, he was, as he always had been, anxious to receive suggestions. He hoped to continue improving; and to illustrate the rapid advance that had been made in the construction of artificial teeth, he drew a comparison between those made ten years ago and those manufactured at the present time.

Dr. Morrison thought that criticism upon imperfect artificial dentures

should bear closer upon the dentist than the tooth manufacturers; for there the greater part of the fault will be found to belong. He considered rubber a great blessing in some cases, and thought it unjust to condemn it on account of its abuse in incompetent hands. He employs it for full cases only, and then obtains a fair remunerative price. He discountenanced the introduction of such work at too low figures, and believed that much of the opprobrium attached to it could be traced to such a course.

Dr. Perkins objected to the unsightliness occasioned by the rubber forcing between the joints, a fault which, it seemed, from its universal presence, impossible to remedy.

Dr. Peebles regarded rubber as a curse to the people, on account of its exceedingly low cost offering encouragement for the extraction of useful teeth. He had seen cases free from the objection just urged by Dr. Perkins.

Dr. Shepard spoke of a bicuspid, in which the lingual face alone was standing; he filled the fang canal partially with gold, and used a rubber tooth for the restoration of the buccal face, retaining it in position by a carefully introduced filling of Wood's metal.

Dr. Hawes said that rubber, when properly manipulated, would not show between the blocks. He thought the expression of rubber work was equal to that mounted upon any other base; had employed it to a great extent, and had cause to feel gratified with the results.

Dr. Benedict thought there were some cases in which rubber was equally as good as gold; yet believed that its general introduction at low prices had led to the sacrifice of more good teeth than had been counterbalanced by the value of the material itself.

Dr. Buckingham thought any fault, apart from the material itself, referable to the *profession* alone. He employs rubber in the majority of cases, and finds it to answer better than anything, other than continuous gum. To be sure, the color is somewhat objectionable; yet, all things considered, he regarded it a great blessing to the community. He believed it impossible to meet the various difficulties experienced in the restoration of contour, without moulding teeth for individual cases.

Dr. W. H. Allen did not think the fact of one man doing poor work for poor prices, precluded another from following directly the opposite course. He first prepares the mouth by filling, and saving the remaining teeth and all firm strong roots; he uses plaster for obtaining impressions, sifting it into the water and mixing it thoroughly; upon removal from the mouth, it is immersed in a solution of soap to prevent the counter-cast from adhering; when, however, difficulty is likely to be experienced in drawing the impression, he would employ wax, varnishing it before attempting to procure a plaster model. In clasp cases he fits the bands around the thickest part of the tooth, trying them in while secured in

place by sticky wax, and instead of soldering them directly to the plate, has an intervening standard, which leaves the neck of the tooth entirely clear, avoiding the ill effect arising from the accumulation and decomposition of particles of food.

Dr. McQuillen related the case of a galvanizer of Britannia ware, (in which process mercury in some form is employed,) who suffered from ptyalism, which was very unjustly ascribed to a piece of rubber work, which the gentleman had been wearing. He also described a case which he had under treatment, where the anterior portion of the inferior maxilla of a soldier had been carried away by a fragment of shell; the remaining portions of the jaw were drawn toward each other, by the contraction of the *mylo-hyoid* muscle, so as to compress the tongue and force it back into the pharynx some distance, and interfering with respiration, deglutition, and speech. With difficulty he had procured an impression of the molars upon either side; fitted clasps and connected them by a silver bar passing around the arch. This apparatus is quite simple, and he believed original, as he had never seen or read of one like it, and when introduced, served to keep the fractured surfaces in proper relation. The fixture consists of two pieces of half-round silver wire, bent in a curve and soldered together, except where the free extremities form the clasps which pass round the teeth. From the result thus far, he was induced to hope for a favorable union of the parts.

Dr. W. H. Allen said that where the lower teeth converge, he takes a sectional impression, using wax upon the inside of the arch, extending half way over the grinding surfaces of the teeth; this, when obtained, is removed, the exposed surfaces varnished, reintroduced, and plaster employed for the outer surface or section. These separate parts, when placed in proper relation, afford an impression from which an accurate model may be obtained.

Dr. Bogue, in fitting clasps, places them and the plate in position in the mouth, and there secures them together by means of gum-shellac melted with a heated iron; this method he had found very valuable, enabling him to obtain perfect fits with little or no trouble.

Dr. Wetherbee offered the following resolution:—

Whereas, Dr. Horace Wells, of Hartford, Conn., in the year 1844, did introduce to the public, in his practice of dental surgery, nitrous oxide gas as an anæsthetic for the painless extraction of teeth; and

Whereas, Nitrous oxide gas, as exhibited by Horace Wells, proved absolutely successful, as is confirmed by abundant documentary evidence at hand, clearly setting forth his claims as the first to bring to public notice any agent producing anæsthesia; therefore be it

Resolved, by the American Dental Association, that to Horace Wells, of Hartford, Conn., (now deceased,) belongs the credit and honor of the introduction of anæsthesia in the United States of America; and we firmly protest against the injustice done to truth, and the memory of Dr. Horace Wells, in the effort made during a series of years, and especially

at the last session of Congress, to award the credit to other person or persons. Carried.

Upon motion, adjourned.

FOURTH DAY.—*Morning Session.*

Called to order at eight o'clock. Minutes read and approved.

Dr. Perkins presented two models of irregularity of the teeth which he had corrected.

Dr. Taft advocated an eclectic course in the selection of a material for a base, believing all of them applicable in certain cases, and decidedly deprecated the practice of an operator accommodating himself to the whims and judgment of an ignorant patient. He favored the introduction of a temporary set as soon as possible after extraction, in order to maintain the natural expression, prevent defective speech, and insure comfort by facilitating mastication. He thought too much importance was attached to mechanical dentistry, while more attention should be directed to the preservation of the natural teeth, believing that their entire loss would, upon an average, shorten life from three to five years.

Dr. Buckingham said that it was pleasing to observe the natural teeth so much more appreciated than some years ago; yet he thought it wrong to discountenance artificial substitutes until *all* could be with certainty preserved; and it was his opinion that, where all were lost, the introduction of an artificial denture would in all probability *prolong* life at least three years.

Dr. Dean, when consulted with regard to the insertion of an artificial denture, would advise the retention of any healthy tooth, regardless of its position in the arch.

Dr. Peebles said that where the two cuspids alone were retained, the plate was apt to split directly opposite those teeth, which accident should be anticipated by doubling in that position. Referred to the impossibility of restoring the fullness and contour given by the roots of the eye teeth.

Dr. Fitch strives to simulate nature, and believed it "the highest art to conceal art." Before the insertion of artificial teeth, he saves all the natural ones possible, and devotes particular attention to the eye teeth, fully appreciating the remark made by the preceding gentleman in reference to the impossibility of restoring the natural expression given by their presence. He thought that attention should be turned more to the preservation of the teeth, even to building up entire crowns of gold; and believed that an operator's estimate of these organs was in exact ratio to his power of effecting their salvation. He regarded the six-year old molar as the most important tooth in the arch, and attributed its early decay to the separate or combined influences of imperfect calcification and want of cleanliness.

Dr. Chesebrough attached the greatest importance to the preservation of the natural teeth.

Dr. J. Allen discountenanced an extreme either way, advocating a medium ground in relation to the extraction of teeth. The variety of circumstances presenting forbids the establishment of any fixed rule, and appeals for decision to the judgment of the operator, which should constitute the umpire in such cases. He said, when the eye teeth are left standing alone, the alveolus shrinks, the teeth loosen, and they become more troublesome than valuable. If removed, the contour of the face, particularly at the base of the alæ of the nose, can be readily restored, by means of continuous gum or rubber. He would not extract *lower* canines, but, whenever practicable, capped any remaining lower teeth, giving to the artificial case a firm and solid foundation. In the construction of artificial dentures he consults the physiognomy, cultivating harmony between the two, and believed it absolutely necessary that every operator should select his own teeth, in order to secure a beautiful and natural looking result.

Dr. Fitch said that in Dr. Allen's own case no additional prominence was required in the position occupied by the eye teeth, consequently the credit of restoration could not be given to the artificial substitute. He described a case of fracture of the inferior maxilla at the symphysis which he had under treatment. He first adjusted the parts, and secured them in place by means of a platina bar, clasped to the molars upon either side, to which the front teeth were fastened by ligatures of very fine platina wire, constituting a tolerably comfortable and entirely immovable splint. The case, in its recovery, was a perfect success.

Dr. Taylor said it was impossible for any *material* to curse the profession. He thought there were many conditions of the teeth clearly indicating extraction, even of the six-year old molar, and supposed several cases to illustrate his position. Said there was more judgment demanded for the intelligent practice of dentistry than that of any other surgical specialty. He advocated the retention of roots when healthy, but should advise the extraction of those diseased and ulcerated. He said that there yet exists a demand for *good* dentists, which cannot be fully met by all the schools in the country or the establishment of more.

Dr. Atkinson objected to the use of the term "ulceration" in connection with a tooth. He discountenanced the extraction of good or even diseased teeth in syphilitic difficulty, believing the violence to occasion more injury than that exerted by their presence, and attributed the sacrifice of teeth to a low estimate of their value, combined with a lack of the skill necessary for their preservation.

Dr. Taylor claimed his nomenclature correct, and would yield only when a new one was offered and established.

Upon motion, it was determined to procure photographic and stereo-

scopic pictures of the body before the close of the session; and for this purpose it was resolved to adjourn at one P.M. to reassemble at half-past two P.M.

Dr. Whitney indorsed the statements of Drs. Taft, Allen, Fitch, and others, but objected to the terms temporary or permanent, as applied to artificial dentures. He expends as much care upon and obtains as good prices in return for first cases as any other. He inserts teeth immediately after extraction, but, as a rule, never allows the plate to overlap the border. He is very particular to retain defective teeth, roots, or even fragments, until the age of twenty or twenty-two years, thus insuring a full and normal development of the arch.

The report of the Committee on Dental Education was given by the Chairman, Dr. McQuillen. He dwelt upon the great extent of the subject, gave the history of his connection with its interests, and thought it an encouraging fact that few would now question the utility of dental education. He advocated dental colleges, favored the support of those already established and the incorporation of new ones, and referred to the tendency of educational advantages to centralize in large cities. Dwelt upon the value of a combination of theory and practice, and thought that too much importance could not be attached to the competency and thoroughness of teachers, who should be possessed of facts, familiar with the writings and teachings of others, and capable of understandingly imparting that with which they themselves are conversant. He commended the influence exercised by association and professional companionship, and regarded it the duty of all to contribute to the knowledge and happiness of the world. He thought it important to so divide the time that each hour might have its allotted employment, not, however, losing sight of the benefit and importance of physical education, particularly that imparted by indulgence in light gymnastics.

Referred to Committee on Publication.

The report of the Committee on Dental Literature was read by the Chairman, Dr. Fitch. He thought that the preparation of a work embracing a complete review of all dental publications ever issued, although a task of magnitude, would afford an invaluable addition to every professional library. He scanned the older works down to the present time, noted the gradual advancement, gave the names of the more recent contributors to dental literature, and criticised the works of Harris, Taft, Richardson, etc. He examined the journals of the day; freely criticised their faults, and as freely extolled their virtues; was aware that strong exertion was necessary to keep works up to the requirements of the times, and thought the objection against their employment as advertising media was invalid, and should in no way detract from their importance and value. He alluded to the blighting influence of the war, and hoped that at its termination a progressive dental literature might appear upon history's record.

Referred to the Committee on Publication.

Dr. Spalding offered the following:—

Resolved, That a special committee of three on Operative Dentistry and also a special committee of three on Voluntary Essays be appointed for the current year, these committees to be filled by the Nominating Committee. Carried.

Adjourned.

FOURTH DAY.—*Afternoon Session.*

Called to order at half-past three P.M. Minutes read and approved.

The report of the Committee on Dental Chemistry was made by Dr. Buckingham. He spoke of the importance of this science to us not only as dentists, but as intelligent men, and regarded an acquaintance with its teachings as absolutely indispensable for the interpretation of physiological phenomena. He thought the sessions of our schools too short to enable students to gain a thorough understanding of this or any other of the valuable branches taught. He said there had been no great improvements since the last report, although the thermo-electric pile was comparatively a new invention, being but eight or ten years old. He described the spectroscope, an instrument employed for testing the presence of materials not otherwise discernible; it shows the *one hundred and fifty* millionth of a grain, and hopes are entertained of its usefulness in detecting malarious emanations.

Referred to the Publication Committee.

The Association then proceeded to the choice of a place of meeting for the coming year. Boston, White Sulphur Springs, Ohio, Providence, Chicago, and Pittsburg were severally suggested; but, upon ballot, Chicago was unanimously chosen.

The Committee on Local Societies was reported by Dr. Taft. He gave an interesting and encouraging account of the various local organizations; named their officers, the number of active, corresponding, and honorary members, their periods of assembling, and many other points of interest. He gave utterance to the encouraging and stimulating fact that more dental societies had been organized during the last year than all the ten years previous.

Referred to the Committee on Publication.

The following report, made by the Nominating Committee, was adopted:—

Committee of Arrangements.—Drs. W. W. Allport, E. A. Bogue, and J. C. Dean.

Committee on Publication.—Drs. J. Taft, G. W. Ellis, J. F. Flagg, I. J. Wetherbee, and C. W. Spalding.

Committee on Prize Essays.—Drs. C. N. Peirce, I. Forbes, F. N. Seabury, Chas. Sill, and A. C. Hawes.

Committee on Dental Physiology.—Drs. W. W. Allport, C. P. Fitch, and C. W. Spalding.

Committee on Dental Chemistry.—Drs. Geo. Watt, T. L. Buckingham, and H. A. Smith.

Committee on Dental Pathology and Surgery.—Drs. J. F. Flag, W. H. Atkinson, W. A. Pease, J. Chesebrough, and G. S. Allan.

Committee on Operative Dentistry.—Drs. J. F. Johnston, W. H. Allen, and A. G. Coleman.

Committee on Mechanical Dentistry.—Drs. John Allen, B. T. Whitney, L. P. Haskell, E. A. Bogue, and W. H. Eames.

Committee on Dental Education.—Drs. Jas. Taylor, L. D. Shepard, and Thos. Wardle.

Committee on Dental Literature.—Drs. T. P. Abell, W. P. Horton, and J. H. McQuillen.

Committee on Voluntary Essays.—Drs. C. P. Fitch, H. Benedict, and S. B. Palmer.

The report of Dr. Palmer was presented and accepted.

Dr. W. H. Allen moved that a vote of thanks be tendered Dr. Palmer for the able manner in which he had discharged the duties of chairman of the Committee of Arrangements. Carried.

Dr. Atkinson moved that he be refunded for any expenses incurred in the discharge of said duties. Carried.

Dr. Palmer moved a vote of thanks to Dr. Miner, of Niagara Falls, for the kindness and attention rendered this body. Carried.

Dr. Kulp gave notice that at the next annual meeting it will be proposed to annul, in Art. 2 of the Constitution, the following sentence: "In every part of the United States;" also in Art. 3d, Sect. 2d, the sentence, "In the Union."

Dr. Spalding gave notice that at the next annual meeting a proposition will be made to amend Sec. 6, Art. 3, by striking out the words "Each member elect," and inserting in their stead "Each new delegate." Also to strike out from same section the words "If a delegate." Also to amend section 1 of article 6, by striking out all after and including the words "And to receive and announce." Also to amend Sec. 2 of same article, by striking out the words "Of which the Corresponding Secretary and Treasurer shall form a part;" and to change the number composing the Committee on Publication from 5 to 3. Also Sec. 3 of same article, by inserting after the words "Association may direct," the words "Or the committee judge of sufficient merit." Also to amend Sec. 1 of Art. 6, by creating a Committee on Operative Dentistry; and also a committee, to consist of three members, to be called the Committee on Voluntary Essays, to whom all papers, other than the reports of committees, shall be referred before being read to the Association.

Dr. Spalding offered the following:—

Resolved, That the Publication Committee be authorized to illustrate the articulator exhibited by Dr. Bonwill, and also any other instruments or apparatus shown or described at this Association. Carried.

The following resolutions were then offered:—

By Dr. Allport:—

Whereas, In the opinion of the American Dental Association, no less than two years' of pupilage in the office of a competent dentist, and attendance upon two full courses of lectures in a dental college, is necessary to qualify a student to practice dentistry properly; therefore

Resolved, That practitioners of dentistry be requested not to take students for a less term than two years, and, under no consideration, unless they agree to attend lectures and graduate from a dental college, before they enter upon the practice of their profession; and that the people should demand of all those who hereafter enter upon the practice of dentistry that they shall hold a diploma from a dental college, as the first requisite to public confidence and patronage. Carried.

By Dr. Fitch:—

Resolved, That Dr. Allport's resolution, in reference to the education of dentists, unaccompanied by any name, yet as emanating from this Association, be published in the newspapers throughout the land. Carried.

By Dr. Benedict: A resolution to create a fifth by-law, providing for the choice of the place of meeting, thus: by voting on all places in the order proposed, and finally selecting from the two highest. Carried.

By Dr. Fitch:—

Resolved, That this Association appoint Dr. J. H. McQuillen a committee of one, to prepare and present, at its next session, a full history of the American Dental Association from its incipency. Carried.

By Dr. Kulp:—

Resolved, That the American Dental Association recommend that dentists everywhere give more attention to the education of the people on the subject of dentistry, by the circulation of essays on branches of the profession valuable to the people. Carried.

By Dr. Taft:—

Resolved, That this Association suggest to all local societies that they enter at once upon some systematic method of giving information to the people in regard to the care and preservation of their teeth.

Resolved, That all local societies represented, or to be represented in this body, be requested to present, annually, to this Association, a report of their condition, standing, and operations during the last year; that report to contain, among other things, the number of members, the number of admissions, the names of the officers, and delegates to this body; also any resolutions or proceedings of general interest to the profession. Carried.

A lengthy discussion here followed upon the most desirable channels for introducing to the public that dental information which they so urgently require. The course adopted by the *People's Dental Journal* received

heartily indorsement, while the additional devices of inserting communications in the daily papers, medical journals, weekly and monthly papers and magazines, such as *Harper's Weekly*, etc., were warmly advocated.

It was, after deliberation, determined to devote a portion of the coming session to clinical demonstrations.

After investing the Publication Committee with discretionary powers, the Association adjourned to reassemble, at Chicago, on the last Tuesday of July, 1865.

AMERICAN DENTAL CONVENTION.

BY G. W. ELLIS, M.D.

THE Convention assembled on Tuesday, August 2, 1864, in the Supreme Court Room, Detroit, Michigan, and was organized at nine A.M., with the President, Dr. Taft, in the Chair.

Drs. Whitney and Benedict were appointed to assist Dr. Watling in discharging the duties of the Executive Committee, and, after consultation, one dollar was announced as the individual assessment, when the following gentlemen came forward, paid their contributions, and signed the constitution:—

ILLINOIS.—W. H. Chaffee, Alton; J. Ward Ellis, T. P. Abell, W. W. Allport, S. B. Noble, L. P. Haskell, Chicago.

INDIANA.—W. F. Morrill, New Albany.

IOWA.—W. O. Kulp, Muscatine.

KENTUCKY.—H. McCollum, Augusta.

MASSACHUSETTS.—S. G. Henry, Westboro'; H. F. Bishop, Worcester.

MICHIGAN.—G. B. Cady, M. H. Knapp, Adrian; G. W. Stone, Albion; C. B. Porter, Ann Arbor; J. A. Robinson, G. H. Mosher, Jackson; Isaac Douglass, R. S. Bancroft, Romeo; S. A. Gerry, A. F. Barr, Ypsilanti; L. A. Rogers, J. C. Parker, Grand Rapids; J. A. Harris, Isaac Voorhies, Pontiac; John H. Warner, St. Clair; S. H. Burgess, Owasso; Jared Kibber, Port Huron; Geo. H. Cooper, Thos. A. White, J. H. Farmer, Henry Cowie, Geo. L. Field, H. Benedict, Detroit; C. E. Bartlett, Battle Creek; H. Cole, Grand Ledge; E. Hause, Tecumseh; H. H. Jackson, Northville; Geo. E. Corbin, St. Johns; W. C. Brittan, Birmingham; L. C. Whiting, East Saginaw.

MISSOURI.—C. W. Spalding, Isaiah Forbes, W. N. Morrison, St. Louis.

NEW YORK.—W. H. Atkinson, W. H. Allen, New York City; B. Wood, J. A. Perkins, Albany; B. T. Whitney, Geo. E. Hayes, Buffalo; P. Harris, Skaneateles; D. L. Overholser, Lockport; F. M. Briggs, Stockton; H. Jameson, Jr., Lyons; J. Naramore, Rochester; S. W. Robinson, Watertown.

OHIO.—J. Taft, P. Knowlton, Cincinnati; E. E. Rogers, Hudson; W. King, Berg Hill; G. W. Nelson, Ashtabula; W. E. Dunn, Delaware.

PENNSYLVANIA.—Geo. W. Ellis, T. L. Buckingham, C. N. Peirce, J. R. McCurdy, Thos. H. Stockton, Jr., S. S. White, Philadelphia; B. M. Gildea, Harrisburg; J. B. Williams, Monongahela City; W. E. Magill, Erie.

TENNESSEE.—S. J. Cobb, Nashville.

CANADA.—Geo. Shattuck, Tillsonburg; L. Clements, Kingston; J. Bowers, Ingersoll; F. G. Callender, Cobourg; W. W. White, Chatham.

The minutes of the preceding session were read and adopted.

The Executive Committee selected and submitted the following subjects for discussion, their report being adopted:—

ORDER OF DISCUSSION.

1. The best means of improving the practice and elevating the profession of dentistry.

2. Anæsthetics—their proper use and relative value.

3. Extracting Teeth—when it should be done and when not; the best instruments for the purpose, and the subsequent treatment, when any is required.

4. Absorption of Alveolar Process—Causes and Treatment.

5. Filling Teeth—the relative value of different materials, and the mode of operating in difficult cases.

6. The best method of obtaining accurate impressions and models of the mouth.

7. The relative value of different materials as a base for artificial teeth.

8. Miscellaneous.

L. W. ROGERS, Utica, N. Y.,	} <i>Executive Committee.</i>
A. W. KINGSLEY, Elizabeth, N. J.,	
J. A. WATLING, Ypsilanti, Mich.,	
A. HILL, Norwalk, Conn.,	
H. A. SMITH, Cincinnati, Ohio,	

The Committee on the preparation of the Kingsley Medal asked further time, which was granted.

The Treasurer presented the following statement:—

Received from former Treasurer.....	\$62 69
From annual assessments.....	103 00
Total.....	<hr/> \$165 69
Expended.....	151 75
Balance.....	<hr/> \$13 94

Drs. W. H. Allen, McCollum, and Gildea were appointed an auditing committee. Upon examination, the report was found correct, accepted, and the committee discharged.

The committee on the admission of dentists into the army was reported by Dr. S. S. White, who repeated the statement made before the Associa-

tion, (which will be found in the report of that body in this number of the DENTAL COSMOS.)

The report was accepted and the committee continued.

Dr. Whitney offered the following :—

Resolved, That this Convention extend an invitation to the medical profession, members of the press, and all others interested, to attend its sittings. Carried.

Dr. Whitney moved that the Convention hold two sessions, from nine A.M. to half-past twelve P.M., and from half-past two to six P.M.

Dr. Perkins amended so that the morning session commence at eight A.M.

Dr. Ellis thought that if the time for final adjournment be fixed, much more would be accomplished in the same period than if it were left undetermined. He therefore offered the following amendment: "and that the final adjournment take place at 5 P.M. on Thursday."

The resolution, thus amended, was carried.

The election of officers being in order, Drs. Kulp and Bishop were appointed tellers.

The balloting resulted in the unanimous choice of the following officers :

President.—DR. W. W. ALLPORT, Chicago, Ill.

Vice-President.—DR. H. F. BISHOP, Worcester, Mass.

Recording Secretary.—DR. G. W. ELLIS, Philadelphia, Pa.

Corresponding Secretary.—DR. W. H. ALLEN, New York, N. Y.

Treasurer.—DR. H. BENEDICT, Detroit, Mich.

Dr. Buckingham moved that the choice of the next place of meeting be made the special order of business for three P.M. the following day.

This was amended to twelve M., and so adopted.

Upon motion, the consideration of subjects five and six upon the order of discussion were reversed.

The induction of officers being in order, Drs. Spalding and Forbes were appointed a committee to conduct the President elect to the Chair, who, upon assuming the position, returned thanks for the honor conferred, and remarked that it was not his intention to make a speech. He deemed it the duty of the presiding officer to facilitate business and set a good example. How far he should succeed he could not say, but would endeavor to merit approbation.

There being no miscellaneous business, adjourned to half-past two P.M.

FIRST DAY.—*Afternoon Session.*

Called to order at half-past two P.M. The minutes of the previous session were read, and, after some minor modifications, adopted.

The retiring President, Dr. Taft, said that he was desirous of making but a few remarks. He spoke of dentistry as a modern institution, partaking of the customs and characteristics of the age, and combining, in

an admirable degree, utility, growth, vigor, energy, and a capability of accommodating itself to circumstances. He said that a retrospect, carrying us back to hold converse with the pioneers and founders of that profession which we view with so much pride, would prove eminently pleasing and instructive, and admiringly referred to the efforts of a Harris, Koecker, Greenwood, etc. He spoke of the great progress of the present, and instanced the perfection of artificial work, in beauty, serviceability, power of restoring contour, and improving speech accomplished by an Allen, Kingsley, and Austin; the advanced standard of pathology borne by an Atkinson, Spalding, etc., and the host of able and earnest workers in the operative department. He said that everything which stands the test and proves truly valuable comes only as the result of labor; he would therefore urge all to renewed effort, deeming it the province and duty of the most advanced to go still further, while assisting those below them up to a more elevated position. He regarded dentistry as a humane profession, and thought that at the present day the public were privileged to *demand* relief from suffering and disease; and any man who does not love his specialty, or follows it from sordid motives alone, has mistaken his calling, and should correct his error. He had heard the dignity of the profession frequently spoken of and its injury prophesied and apprehended; yet he thought it useless to dwell upon such a subject, when, by the performance of individual duty, its establishment and maintenance were certain. He regarded associated effort as a powerful agency for advancement, and viewed with pleasure the promising future.

The first subject, "The best means of improving the practice and elevating the profession of dentistry," was declared in order.

Dr. Taft spoke of the mean character of that competition which reduces the standard of work, both in price and quality, and regarded it the duty of every practitioner to execute the best operations, employ the best instruments, material, etc., and charge accordingly, believing it an impossibility to elevate the profession without first improving the practice. He referred to the necessity of study and investigation to insure advancement, and believed that the continuation of such progress as we now witness would in a few generations do away with the necessity for artificial dentures.

Dr. Atkinson said the question was one which had long been of interest to him. The reason why a profession commands more than any mere handicraft is, because of the time and labor spent in the acquisition of the knowledge necessary for its execution; and in consideration of this fact, he regarded it a shame that the colleges were so poorly supported, and thought there should be encouragement enough offered to lead to the establishment of a school in every State, instead of the meagre patronage accorded to those already in existence. He considered that dentists should be anatomists, chemists, metallurgists, and the embodiment of a thorough

knowledge of all the physical sciences; and in view of such a vast field, would oppose any admission into the ranks of our profession without the evidence of an initiatory pupilage, of at least three years. He thought every one should recognize his own and others' powers and shortcomings, and evince a willingness to occupy his own sphere, and accord to each the position which his qualifications merit. He strongly favored association, and believed that exclusiveness would lead to retrogression.

Dr. Spalding thought that an effort for the elevation of the profession should be preceded by an investigation of the depressing influences. He thought it a prime defect to permit the student to enter upon the study of dentistry, without first impressing the absolute necessity of a good education, the magnitude of the task he proposes to assume, and the sacrifices required in the execution of its demands. Another improvement, capable of elevating the status of the profession, is the education of the people, a measure he would advance by any legitimate means.

Dr. Perkins thought the remuneration a very important matter, not to be ignored, since each man is supposed to have chosen his occupation as the means of procuring himself a livelihood. He advocated earnestness in the investigation of any subject, and while he was capable of enjoying a good joke, would at such times discountenance all frivolity.

Dr. Magill advocated the education of the people through the agency of the press, and considered the performance of good work almost as available for imparting a knowledge of the importance and value of dentistry. He hoped by such means to realize the proud position to which we so earnestly aspire. He believed that circumstances would vary charges, and thought that in some cases the remuneration offered would not command the highest class of work.

Dr. Peirce believed with Dr. Taft, that we should not endeavor to make work meet a pre-established fee, but should charge in accordance with our estimate of its value when completed. He condemned discrimination between rich and poor, and would do his best for the servant as well as for the master.

Dr. Bishop always prepares the mind of the patient during the operation, by conversation, from which by inference the cost of the work can be approximately anticipated. He thought that much valuable information could be imparted by conversation at the chair, and regarded this as one of the easiest and most available means offered for the education of the public.

Dr. Robinson remarked that in saying it is the *quality* of the work which makes the man, he but reflected the minds of all present. He had removed to Michigan some years since, and although at first opposed in his prices, he soon surmounted the difficulty; as any one may do who is willing to be estimated by his works.

Dr. Spalding cannot fix the price of an operation before its performance. He would, however, give an approximation of its value, believing that much due the patient.

Dr. Perkins advocated giving the patient an approximate of the cost of operation, in order to avoid any dissatisfaction which might arise from an unexpected heavy charge. Thought that such a course would avoid misunderstandings, and establish feelings of friendship and appreciation.

Dr. Atkinson thought that the propriety of such a course depended upon circumstances, and advocated every practitioner taking a high-moral position, and thus teaching others to rely upon his honor.

Dr. Magill, speaking in relation to high prices, advocated in dentistry, as in any other occupation, the greatest good to the greatest number; and believed that any philanthropic and honorable practitioner would serve the poorer class, rather than force them into the hands of charlatans.

Dr. Perkins does not advocate exorbitant charges, but fair remunerative prices.

Dr. McCollum said that every man should charge in accordance with the estimate he places upon his own ability, and the public will be found to place a like estimate upon his acquirements.

Dr. Buckingham moved going on to the next subject, "Anæsthetics—their proper use and relative value."

A paper from Dr. G. T. Barker, upon Anæsthesia, was read by the Secretary. Dr. Atkinson also read a paper upon the same subject.

Dr. Buckingham objected to the synonymous use of words and expressions, which convey to the mind different impressions, and considered it a mistake to confound, as had been done, the galvanic and magnetic forces with life force. He described the difference between the animal and vegetable cell, and did not think that either were oxidized or de-oxidized, or contained perceptibly more oxygen one time than another; but if all action is arrested, anæsthesia will be induced.

Dr. Gerry could not understand the theory of polarization, but had experimented with chloroform to a great extent, and found that its first effect was to lull the nerves of sensation, and afterward those of motion. He never saw a case of death resulting from its administration, except among the inferior animals, of which he had killed a host, having exhibited it to over four hundred; a plan which he advocates as invaluable for the acquirement of information. He would not decide in regard to the relative safety of different agents; but himself accorded the preference to chloroform. He believed the medulla almost the first point touched, as evidenced by the disturbed respiration. In its administration, he prefers the recumbent posture, as anæsthesia is more readily induced. When it is hastily given, death is produced as it were by suffo-

cation; but when more slowly exhibited, the effects are manifested more slowly.

Dr. Buckingham said that the effects of agents are made known only by experiment, and thought that death might be occasioned in various ways, either by over-stimulation, depression, or by direct action upon the nerves. Dr. Snow found that when the effects were very slowly induced, the animal might be revived; when, however, greater proportions were used, the heart was paralyzed, instant death resulting. He believed chloroform or ether safer than nitrous oxide gas, and urged, as objections against the latter, the difficulty of pure generation and keeping, and the method of administration.

Dr. Spalding prefers chloroform, because he knows how to use it, and advises its administration, largely diluted with atmospheric air.

Dr. Magill believed that fatal cases occurred as the result of ignorance or carelessness.

Dr. Corbin thought that none of these materials could be used with impunity, believing any agent capable of suspending sensation dangerous to a certain extent.

Dr. Spalding gives a liberal dose of some alcoholic beverage before the administration of an anæsthetic.

Adjourned.

SECOND DAY.—*Morning Session.*

Called to order at eight o'clock. Minutes read and approved.

Dr. Forbes gives chloroform to any patient, regulating the quantity according to the temperament; giving less to persons of full habit and short neck. He cannot tolerate ether, and consequently never employs it.

Dr. G. W. Ellis had considerable experience with both ether and chloroform, using the former almost exclusively, but employing the latter whenever circumstances indicated. He administers it from a sponge, held in the hollow of the hands, and believed it possible, for one conversant with the anatomy and physiology of the nervous structures, to recognize each step of the operation, and trace the successive influence of the anæsthetic upon the various portions of the brain. He never employs the ether and chloroform mixed, but thinks he derives better results from their alternation in cases where it is necessary to hasten anæsthesia, or control the excessive stimulation, sometimes, though *very* seldom occasioned, by the former agent. He believed all anæsthetics dangerous in uneducated and incompetent hands, and regarded the consciousness of knowledge of the subject the true secret of success in their administration; for one lacking faith in his own ability, cannot inspire in another that confidence which is an indispensable prelude to a satisfactory result. He had no knowledge of nitrous oxide, other than that derived from

reading, and the two agents mentioned proving all he desired, there had been no incentive to induce him into a practical examination of its merits. With others, he was able to say that, in his practice, extraction was now an exception, where once it approached too closely to a rule.

Upon motion, proceeded to the next subject, "Extracting Teeth: when it should be done and when not—the best instruments for the purpose, and the subsequent treatment, when any is required."

Dr. Magill, for the arrest of hæmorrhage, would first employ the simpler means, afterward resorting to a cone-shaped plug of leather. He mentioned a friend, who had met with success by the use of cobwebs introduced into the socket.

Dr. Bishop wanted comparisons with regard to the general extraction of teeth, and not particularly as practiced between the ages of ten and twenty years.

Dr. Perkins mentioned a practitioner who, upon discovering decay between the bicuspid on either side, would remove one, as in attempting to save both, the two were mostly lost; this, however, was contrary to his own practice.

Dr. Robinson mentioned the case of a young man, in whom the loss of a tooth from the lower jaw, right side, and one from the upper jaw, left side, had occasioned a moving of the teeth in opposite directions, giving the jaws a twisted appearance. He asked whether, in such cases, it would be advisable to remove a tooth from the opposite side, in each maxilla, in order to prevent the deformity? He appreciated the value of the six-year old molars, and lamented the fact that, at ten years of age, they were mostly past redemption. He referred to a wisdom tooth which had baffled his efforts for its removal.

Dr. Bishop was in favor of putting forth every effort for the salvation of the six-year old molar; but regarded the bicuspid as the teeth most difficult of preservation.

Dr. Taft regretted the tendency to run into methods and rules, rather than depend upon broad principles, which alone should be discussed, and the application of which must be regulated by circumstances. He believed that teeth, which might with propriety be extracted by one operator, it would be the duty of another, more capable, to save.

Dr. J. Ward Ellis thought it important to know how to treat the teeth of children, under ten years of age, and was in favor of the preservation of those belonging to the deciduous set as long as possible. He often finds it necessary to remove sound teeth in order to afford more room in a crowded arch, or for the correction of an irregularity. When efforts for the preservation of a tooth had failed, he would advise its extraction.

Dr. Peirce thought it wrong to prematurely sacrifice either the temporary or permanent teeth, and believed that from the moment of eruption,

they require the inspection of a dentist. He deemed it the duty of a practitioner to institute a close examination into the condition of the temporary teeth, and carefully fill those giving the first indication of caries. He dwelt upon the importance of preserving even the fangs of temporary teeth, in order to insure the full development of the arch; and mentioned the case of a young girl, sixteen years of age, who still retained eight deciduous teeth in the lower jaw, in addition to twelve of the permanent set.

Dr. Magill believed that the extraction of temporary teeth would sometimes injure, or even entirely destroy the permanent ones beneath, and was strongly in favor of their preservation. He hesitated to employ arsenic for the destruction of pulps of deciduous teeth, but had been in the practice of covering the exposed surface with wax, moistened upon one side with creosote, and capping the whole with a metallic filling; several months' experience in such treatment has proven very encouraging.

Dr. Overhalser wished to know whether scattering teeth should be removed before the insertion of an artificial denture.

Dr. Forbes depends upon his own judgment; in cases of chronic periostitis, which he deemed incurable, he would extract, and also where a patient expresses a determination to have a decayed tooth removed and will not listen to reason, he has been prevailed upon to yield.

Dr. Gerry endeavors to save the six-year old molars, after exposure of the pulp, but often fails where there exists a strong tendency to local inflammation. He treats periostitis by drilling through the alveolus down upon the apex of the fang, thus drawing blood, and also by depletion of the gums.

Dr. Field extended an invitation for members of the Convention to visit the valuable and interesting museum of Major Cass.

Upon motion, the invitation was accepted, and the Convention resolved to adjourn at 11½ A.M., to reassemble at 3 P.M., in order to afford the members time to avail themselves of this *rare* opportunity for visiting a *rare* collection.

The Chair appointed Dr. Field a committee to wait upon Major Cass, and report the Convention's acceptance of the invitation, and ascertain whether the hour selected would prove convenient.

Dr. Field reported that the hour chosen would prove agreeable.

Upon motion, his report was accepted, and a vote of thanks tendered.

Dr. J. Ward Ellis, in speaking of the instruments employed for extraction, would advocate each one selecting for himself, and using such as he deemed best. He uses cotton, steeped in creosote, for the arrestation of hæmorrhage.

Dr. Whitney uses the perchloride of iron for controlling hæmorrhage.

Dr. Buckingham thought that the remarks of Dr. Ellis in relation to the choice of instruments had covered the ground quite effectually. In

extracting, he does not always lance the gum, but makes it a rule to remove a tooth as quickly as possible, and prevent the unnecessary prolongation of a very disagreeable operation. He said that forceps were mostly employed, yet was quite partial to the elevator, and mentioned a dentist of Philadelphia who extracted nine thousand teeth a year, using this instrument exclusively. He had found it more applicable in the lower jaw, particularly for wisdom teeth. Had used it in the upper jaw also, but with less success; it had also proved very serviceable in removing the six front roots. He wants the instrument constructed with an octagonal handle, in order to prevent its turning in the hand upon the application of force.

Dr. Overhiser has used the alveolar cutting forceps with success.

Dr. Allport thought there was a general misapprehension of the force employed in the use of the elevator; many believing that violent pushing or pulling was necessitated. This instrument, however, acts upon the principle of a wedge, a dextrous insinuation of its point between the root and socket accomplishing the removal of the former with the application of but very little force.

Dr. Kulp uses different sizes of root forceps, so sharp, that no lancing is requisite.

Dr. Atkinson thought the best instrument, the one that best obeys the will of the operator.

Upon motion, proceeded to the next subject of discussion, "Absorption of alveolar process—causes and treatment."

Dr. Atkinson said that we must understand general principles in order to treat disease, which is dependent upon one of three causes, viz., psora, psychoses, or syphilis.

Remarked that there were two forms of disease affecting alveolar tissue, viz., mercurial and syphilitic: the former expending its energy upon the periosteum and outer plate at its lower edge, while the latter attacks the cancellous tissue and upper portion of the outer plate. In primary syphilis, the use of creosote, or some application for destroying the action of the virus in its incipency, is indicated. In the secondary form, constitutional derangements should be first corrected, which he accomplishes by the administration of one grain of hydr. protiodide, and one grain of opii pulv. in pill, until the system is touched with mercury; when the hydriodate of potash is heroically exhibited in a solution formed with iodine. In these cases he remarked that the disease and remedy would counteract each other, the system thus tolerating incredibly enormous doses without the effects of the drug being made manifest. He mentioned a case in which he had gradually increased the dose, from one pill to eight, night and morning, before touching the gums, when he commenced with drachm doses of hydriodate of potash in solution, three times a day. Through this treatment the gentleman was enabled to leave at the expi-

ration of six weeks, with the disagreeable odor gone and a good plasm weeping, the appearance of the latter always being an indication for the cessation of treatment. The topical applications which he employs are tinct. iodine, iodine in glycerin, creosote and wine of opium, tannin and glycerin. When the bone is necrosed, he removes the dead portion before the line of demarkation appears, enucleating, by means of a properly-shaped blunt instrument or spud. He mentioned the case of Brignoli, the singer, whom he treated for the denudation of the palatine fang of an upper molar, with the result of covering its sides one-third of the way down, and having an encouraging prospect of the almost entire reproduction of the alveolus.

Dr. Buckingham thought that the treatment of syphilis did not come within the province of the dentist, but believed that the subject, in its selection, had reference more particularly to the absorption of the alveolar border after extraction, by the natural process.

The hour having arrived, the choice of the next place of meeting was made the order of business, when the Convention, with but little detention, unanimously pronounced in favor of White Sulphur Springs, Ohio.

Dr. Kulp offered the following:—

Whereas, The President of the United States has appointed Thursday, August 4, as a day of fasting and prayer; be it therefore

Resolved, That this Convention observe the day by suspending the regular order of business from ten to half-past eleven A.M. to-morrow, and that the Chairman appoint a committee of three to arrange an appropriate programme. Carried.

In accordance with this resolution, the Chair appointed Drs. Kulp, Taft, and S. S. White.

Adjourned.

SECOND DAY.—*Afternoon Session.*

Called to order at three P.M. Minutes read and approved.

Dr. Perkins referred to the persistent spontaneous separation of the teeth occasionally observed and producing a very unsightly appearance:

Dr. Taft believed that almost every case of alveolar absorption was due to systemic influence or influences, the local cause, however, sometimes consisting of a deposition of tartar or inflammatory action in the gum. He thought what was termed absorption was frequently nothing more than a simple solution and washing away of the alveolar tissue. Defective nutrition would often be found to be the cause of such difficulties, arising either from too little food, a misappropriation of that presented, or the presence of poisonous or contaminating influences in the blood, and calling for the administration of constitutional remedies before or in connection with topical treatment. To treat cases intelligently, he believed it indispensable to possess the power of appreciating individual peculiarities. He said that where teeth move and remain apart, there is an absorption of alveolar structure upon one side, and a corresponding

deposition upon the other; but in relation to the cause of such separation he was unable to pronounce.

Dr. Atkinson said that the gum wastes from a want of that support which the alveolar tissue had previously afforded.

Upon motion, the next subject, "Filling Teeth: the relative value of different materials, and the mode of operating in difficult cases," was taken up.

Dr. Perkins spoke of the necessity of cutting out all sulci surrounding a cavity, even where they extend entirely over to the margin of the gum.

Dr. J. Ward Ellis indorsed this practice of Dr. Perkins. He would like to hear the various methods employed by gentlemen for keeping the lower teeth dry during filling, as this was a point which had occasioned him more than a little annoyance, sometimes compelling the reluctant performance of a submarine operation.

Dr. Perkins holds his napkins in place with the fingers, and changes them as often as requisite, without any difficulty. He spoke of a case in which he had satisfactorily prevented the annoyance from hæmorrhage of the gum by a soft pine wedge, driven in well up between the necks of the teeth.

Dr. Whitney uses wedges of wood between the teeth in filling, but does not force them in with the mallet.

Dr. Bishop also introduces wood between the teeth by hand force, but in some cases makes use of cotton twine.

Dr. Allport, in order to check the flow of saliva, first wipes the mouth dry with cloths, and then places rolls of bibulous paper over the orifices of the ducts, covering these again with a napkin, which he retains in position by his fingers, never having employed a tongue-holder of any description. In approximal cavities approaching the margin of the gum, he almost invariably introduces a wedge, being particular to insert it below the edge of the cavity, although a little pain should be induced. He regarded *precision* and *rapidity* of manipulation as a most valuable combination, and did not consider *slowness* as at all requisite for the performance of a good operation.

Dr. Forbes said that when one hour had been expended in the preparation of a difficult lower cavity, he would dismiss the patient, and complete the filling at another sitting, thus avoiding the annoyance occasioned by restlessness and a profuse flow of saliva provoked by lengthy manipulation. He fills with cylinders; and in lower approximal cavities first forces a large one down upon the bottom, which, being allowed to project beyond the edge, prevents the saliva from finding ready ingress at that border. He always excavates and fills the fissures alluded to by Dr. Perkins; yet thought that they would sometimes occur after the performance of an operation, which fact should prompt us to be charitable in our opinions of others.

Dr. W. H. Allen uses adhesive foil, heating each pellet in the flame of a spirit-lamp before its introduction, and builds up from the retaining points out with serrated instruments and the mallet. In weak, frail teeth he fills so as to have the gold hold and support the tooth. He fills very small approximal cavities in front teeth with crystal gold. To prevent the seeping of mucus from the margin of the gum, he employs the method suggested by Dr. Metcalf, of encircling the tooth with a string loosely wrapped with foil, which may, by gentle pressure, be sufficiently well adapted to the necks of the teeth.

Dr. Atkinson said that any man who does not make the tooth and filling reciprocally support each other, can be classed no higher than a second-rate operator. He gains all the space desired by properly shaping a wedge, rounding its corners, and driving it between the teeth with one, two, or three taps of the mallet, and discountenances the wedging of teeth over night, or for any time longer than that consumed in the operation of filling. Having obtained the desired separation, he prepares the cavity, bevels the edges, fills overlapping, files off the surplus of gold, rasps down with corundum tape, and burnishes upon the surface a ribbon of five, six, or eight layers of No. 6 foil, which gives an even and beautiful finish. When teeth are loose and movable, he supports with wedges during the introduction of a filling. He said that the virtue and perfection of a filling depend upon its accurate adaptation and power of excluding moisture and all foreign materials, and thought that the discoloration of soft foil fillings was owing to their imperfect packing.

Dr. Peirce believed that by the use of cotton and gum sandarach for thirty-six hours, a separation might be obtained with much less pain than that occasioned by instant wedging. Thought that a practitioner should form a mental impression of an operation, from its beginning to its completion, before its commencement. He considered Dr. Forbes right in his consideration of the comfort and interest of the patient, and would not himself excavate and fill difficult cases at the same sitting.

Dr. Atkinson said that wedging would, from pressure at the apical foramen and consequent tension of the pulp nerve, in a measure anesthetize a tooth.

Dr. Parker called attention to a method of keeping the mouth dry, which was certainly new and original. He employs disks of porcelain, which, being placed with the convex surface next the ducts, arrest the flow of saliva, and frequently adhere strongly to the surface of the mucous membrane. He has a number of these plates, as, after being once used, they require heating before suitable for a second application. Between teeth he places a small piece of spunk saturated with perchloride of iron, to prevent the exudation of moisture during the consolidation of the gold.

Dr. Taft spoke of the difference in the character of saliva, and said that

he would never perform a submarine operation. He succeeds in keeping the mouth dry by means of bibulous paper placed over the ducts, upon the tongue, and a little roll under the wedge when filling between teeth, renewing the latter occasionally, when necessity required. He employs the double-pronged tongue-holder for retaining the paper in position and preventing interference from the tongue. He uses the warm air blow-pipe for drying the cavity, and believed that the difficulty from rolling or tipping of the gold would never occur if carefully worked from the centre toward the ends. He uses adhesive foil No. 4 almost exclusively, and believed it disadvantageous to make frequent changes, which always necessitate an alteration in the method of operating.

Dr. Robinson packs the walls of a cavity with non-adhesive, and fills in the centre with crystal gold foil.

Dr. J. Ward Ellis would not advocate filling under water, but had met with cases in which he was unable to do otherwise, and had been pleased and surprised to find fillings introduced under such unfavorable circumstances presenting a perfect appearance, even at the expiration of six years. He did not think the profession so wonderfully in advance of twenty years ago, and could not yet regard the mallet or any other peculiar method of manipulation as indispensable to the accomplishment of the best results, for he was frequently seeing *perfect* fillings which had been introduced some twenty-five years ago by hand pressure alone. In filling between molars, he files a V-shaped opening, cuts through the crown of the tooth, and fills perpendicularly downward.

Dr. Perkins fills at the sides and bottom of a cavity with non-adhesive foil, and in the centre with adhesive gold, condensing with the mallet. He cared not what material was employed or how it was manipulated, so that the great desideratum—the *preservation of the tooth*—was accomplished; and referred to a filling in his own mouth of twenty years' standing.

Dr. Robinson regarded tin foil as a valuable agent for the preservation of teeth, and instanced a filling of this material which has now stood the test of sixteen years.

Dr. Buckingham regarded tin foil as a very good substitute for gold. He advocated social clinical gatherings of the profession for mutual benefit.

Dr. Burgess believed amalgam applicable in some cases, and instanced several perfect fillings of that material, which he had recently seen, of twenty years' standing.

Dr. Gerry said that if he possessed any hobby, it was surely his uncompromising opposition to amalgam; and when asked the ground of his objection, replied that it was from the fact that mercury is such a powerful oxidizing agent.

The following gentlemen were announced as constituting the Executive

Committee for the ensuing year: Drs. Taft, Peirce, Forbes, Robinson, and Atkinson.

Adjourned.

THIRD DAY.—*Morning Session.*

Called to order at 8 A.M. Minutes read and approved.

Dr. Taft had used a great many kinds of foil, and manipulated in as many different ways, but now confined himself entirely to adhesive foil, employing the mallet for its consolidation, and believed if compelled to abandon the use of this instrument, it would almost necessitate his ceasing the practice of dentistry. He remarked that care and skill were necessary to obtain a good adaptation to the walls of a cavity with any gold, and thought that each one should operate in the manner by which he can accomplish the best results. He regarded solidity and adaptation as the requisites for a good filling, and believed these points met most thoroughly by the use of adhesive foil, which he considered not only makes the best filling, but enables us to successfully fill cavities where the non-adhesive gold would not be retained. He always pits the bottom of a cavity for anchorage, and in approximal cavities applies his force as near as possible in a line with the axis of the tooth.

Dr. Perkins had seen and could produce many hand fillings which would defy the efforts to force a plugger through their substance. In some cases he regarded the mallet as very useful, while in others he believed it entirely inadmissible, consequently he disliked to hear such sweeping assertions, either in favor of or against any instrument or method of practice, since they give false impressions and are likely to mislead.

Dr. Taft said there were of course exceptional cases, in which the use of the mallet would be inconvenient and unadvisable, as upon the posterior face of a wisdom tooth.

Dr. Atkinson uses the mallet *always*, and referred to the advantage gained in the distribution of force and the ease with which delicate and tender teeth may be filled. He prefers the mallet instruments to have an angle of from twenty-two and a half to forty-five degrees. If the enamel was exceedingly thin, he had filled over paper in order to retain, as near as possible, the natural color of the tooth.

Upon motion, business was suspended for the presentation of some bills, which were ordered to be paid.

A letter from Dr. A. Hill was read by Dr. Allport, in which he regretted his inability to meet with his beloved brethren; and stated that a severe attack of neuralgia had disqualified him for both business and travel. He sent his best wishes, desired to be remembered to all old friends, and wished to impress that necessity and not indifference was the cause of his absence.

The following communication from Dr. S. J. Cobb was read by Dr. Abell:—

Having attended the American Dental Association that met at Niagara Falls, on the 26th ultimo, not as a delegate, but as an interested spectator belonging to the profession, I must say, with all candor and honesty, that I do feel that the three days there spent in that Association was of more interest and value to me than any three days that I have ever spent since I first engaged in the dental profession. I say this, from the fact that it has never been my good fortune before to attend a meeting either of the American Dental Association or the United States Dental Convention. And now, gentlemen, with your consent, I will make one or two suggestions in addition to those I have heard both here (United States Dental Convention, at Detroit) and at the Association at the Falls, upon dental education. And just here, before making any suggestions, I will say that I do most heartily indorse all that I have heard both here and at the Falls, tending to the education not only of dentists, but the people. I am an advocate of education, notwithstanding my own is limited. Possibly that is the reason why I see, feel, and know the importance of it. We want early education. We want it as early as it is possible to obtain it. Viewing the subject in this light, I come to my first suggestion, and that is, we, as teachers, for we are, and if we are not, we should be, notwithstanding I must confess my inability to teach as I ought, or would like, should go where all teachers first go, and that is, to the school-house. There is where the education of man is commenced; and as we wish to reach the masses or the entire people with our profession, we propose going to the commencing place, and there begin with other teachers, and not only begin, but go through with them,—keep pace with them from the simplest to the most scientific and complicated book that is used in school or college. I do not mean to say in this paper what method of instruction we will introduce in school books, but merely mean to advocate the idea, so that we may take it into consideration; call into counsel our entire profession; not only that, but also call in the ablest authors and publishers of the different school books, and we will soon find a way and plan for what we have. I feel assured, gentlemen, that we can, if we will, furnish to the different authors and publishers of school books some of the most important and valuable matter that has ever found place in their works. I feel further more assured that there are none, save ourselves, that will hail with more delight and pleasure the forthcoming of such valuable instructions, than the authors and publishers of the above-mentioned books. So I would say to one and all, let us go to work and see what we can do. Before closing, I will suggest an idea in regard to the dental lessons proposed for school books. We may put it in as questions, asked and answered, as in geography, and other primary studies. For instance, the little fellow stands before you. Question. How many teeth have you, or how many constitute the deciduous set? The answer is given. At what age do you get these teeth?

Answered. How long does nature design these teeth to serve you? Answered. Is it important that these teeth should be preserved in a healthy condition during this period? Yes. Why? Answered. Can you preserve them in this condition? Answered. How? Answered. And so on, with the second or adult set, and with many lessons of great importance.

We want to give our instructions in a plain, simple, matter-of-fact sort of way. Want to make our dental lessons easily learned, and long remembered. And now, gentlemen, in conclusion upon this subject, I will say, when we have introduced into the different school books that amount of dental intelligence that we ought to have in them, we can promise ourselves, in a fourth or half century, at furthest, that the people, as a mass, will be fully able and competent to appreciate our services as a dental profession. We will then be able to take the elevated and high position that we have long worked for. We may promise ourselves much, in less time than twenty-five years, from this course or method of instruction; but we must not expect too much in a short time; if we do not reap all of the benefits, somebody else will. I am sure we are receiving the benefits of the hard labor of those who have preceded us, and as such we should certainly feel under obligation to do as much for those that follow us.

This being the first time that I have ever had the honor and pleasure of participating in a meeting of this kind, and having had very little or no experience in preparing an article of the kind, I hope to be excused for the shortcomings that may be found therein.

Respectfully,

S. J. COBB.

NASHVILLE, TENN.

Dr. Robinson moved that a committee of three be appointed to prepare a dental catechism for introduction into the common school books.

Dr. Abell delivered an earnest and eloquent speech upon the subject of dental education, in the course of which he remarked that, although he would advocate an effort in the direction proposed, he anticipated difficulty in introducing such a book into the schools. He spoke favorably of the course taken by the *People's Dental Journal*, and would suggest, in connection with this plan, the establishment of a high and remunerative scale of prices, as one of the first means for educating the public to an appreciation of their teeth, and elevating the dignity of the profession.

Dr. J. Ward Ellis advocated the principle embodied in the *People's Dental Journal*, but while the cost of this publication, though small, would preclude its introduction among the poorest classes, the influence of a catechism, such as proposed, would make itself felt in the lowliest hovel in the land.

Dr. Robinson's motion was amended, so that the committee should consist of five members, and so adopted.

The following gentlemen were appointed as members of that committee: Drs. Taft, Abell, Spalding, Buckingham, and Robinson.

Dr. Haskell remarked that, by an increase of circulation, the *People's Dental Journal* could be furnished at much lower prices, and stated that the first number of the first volume could be obtained for distribution at the rate of five dollars per hundred.

Dr. B. Wood read a paper upon "The Advancement of the Dental Profession," in which he set forth claims for the recognition of inventors who contribute much toward the progress, value, and elevation of the dental specialty.

The hour of ten having arrived, religious exercises were opened with prayer by Dr. Atkinson, followed by the singing of a hymn, and the reading of the Scriptures by Dr. Taft.

Short, spirited, and *patriotic* addresses were then delivered by Drs. Atkinson and Robinson.

After a prayer by Dr. Kulp, the loyal and earnest strain of remarks was continued by Drs. Taft, Perkins, and Abell. A prayer from Dr. Taft was followed by the Doxology.

The divine exercises having terminated, the regular order of business was resumed, and the next subject taken up for discussion, viz., "The best method of obtaining accurate impressions and models of the mouth."

Dr. W. H. Allen said that when the lower teeth incline toward each other, he takes an impression of the inner surface in wax, allowing it to extend half way over the grinding surfaces; this he removes, varnishes, reintroduces, and completes the outer section in plaster. In ordinary cases he obtains a wax impression first, afterward employing it as a cup for the retention of the plaster.

Dr. Spalding said that for anything like a full denture, he first takes an impression in wax, makes the models, and swages a metallic plate, which, being coated with plaster, he employs as a cup for obtaining the final impression; in lower cases, sometimes covering it merely with a thin coating of wax. Difficulty had been sometimes experienced from the plaster becoming detached from the impression-cup; this, he said, might be obviated by varnishing the metallic surface, and placing cotton upon it before dry; the plaster, when setting in the meshes of the cotton, would be held firmly in place.

Dr. Field employs the same method as Dr. Spalding, with the exception that he punches holes in the plate for the retention of the plaster.

Dr. Kulp has entire and partial impression-cups, and in full cases uses plaster exclusively, while in partial cases he employs wax and paraffine, a material which he regards as particularly applicable where the teeth converge in the manner referred to. As a base for artificial teeth he almost invariably uses rubber.

Dr. Whitney first takes an impression in wax, makes models, and swages a trial-plate; placing wax upon this, he obtains an impression from the plaster model, trims off any superfluous material, ruffles the surface, covers it with a very thin coating of plaster, and procures an accurate and final impression.

Dr. Kulp puts salt into the plaster to hasten setting, pours the water upon it, mixes, and waits until it commences to stiffen before he introduces it into the mouth.

Dr. W. H. Allen thought it proper to sift the plaster into the water while mixing.

Dr. Haskell thought that nothing was gained by going beyond a simple plaster impression. In difficult partial lower cases, he draws before the plaster becomes too solid, and if any pieces become detached, places them in their proper position upon the cup.

Dr. Buckingham spoke of Dr. Wildman's plan of coloring plaster, to render the lines of separation between the impression and model more easily discernible. By experiment, he was forced to believe that the expansion of plaster was not appreciable.

Dr. Haskell also thought that the expansion of plaster was too trifling to merit consideration.

Dr. Perkins could always succeed with the pure, tough, yellow wax; in softening it, he is careful to avoid overheating, which injures its texture, destroying the toughness.

Upon motion, passed to the consideration of "The relative value of different materials as a base for artificial teeth."

Dr. Kulp had used rubber in 2000 cases, his patients preferring it to any other material. He regarded it as a blessing, and thought its opponents were generally those who had no experience with it.

Dr. Perkins thought a vote of censure deserved for such wholesale destruction of the natural teeth, as must have been made for the introduction of so much artificial work. He regarded continuous gum as the acme of mechanical dentistry, gold and silver following in succession. He considered the combination of rubber and gold-wire gauze was the only promising way of using the former material which he had yet seen.

Dr. Kulp explained, that in his section of country the teeth had been ruined by charlatans, and he was now engaged in repairing the damage which they had inflicted.

Dr. Dunn has for the last eight years given porcelain the preference over any other material for entire sets, and would call upon Dr. Hayes to testify with regard to a case which he had inserted in that gentleman's office, and which he had seen some time after its introduction. For partial and temporary plates he makes use of rubber.

Dr. Hayes testified to the entirely satisfactory nature of the case introduced by Dr. Dunn. For obtaining impressions, he uses a metallic

cup, with a perpendicular edge, which he trims out to prevent cutting the membranous reflections and prominent points; this is filled with plaster, allowing it to lap over the edges of the cup, and also clamped at the heel of the plate, in order to prevent shrinking of the impression when it is afterward gently drying over the flame of a spirit-lamp. After this treatment, it is invested with sand, and a fusible metal, of one-quarter antimony to three-quarters tin, poured upon its surface, giving the male die, from which the female is obtained, by running upon it a mixture of tin and britannia. He could get a better adaptation with gold, and preferred it to any other base, yet thought that entire porcelain and continuous gum were probably the most artistic styles of work, although the additional bulk necessary to insure strength in either case would prove somewhat objectionable.

Dr. Spalding procures dies in the same way as Dr. Hayes, but uses a mixture of tin, antimony, and bismuth, employing the same metal for both sections of the model.

Dr. Hayes said that he added antimony enough to render it, when poured upon a cold surface, capable of being bent a little without fracture.

Dr. Field, in introducing clasps, has them connected to the plate by an intervening standard of metal, thus preventing injury to the teeth by the collection and retention of food.

Dr. Buckingham thought that a perfect fit could be obtained with rubber, and in finishing such cases never interferes at all with the upper surface. He had found rubber very useful for filling under the teeth in gold cases, and also for repairing work mounted upon that metal.

Dr. Perkins thought that the springing of rubber plates was due to their removal from the flasks before cool. He builds well-defined air-chambers upon the plaster model, and has them, with sharply-marked edges, upon the metallic plate. He would prefer never to use clasps, but was sometimes forced to against his will.

Dr. Whitney does not use an embracing clasp, but simply solders to the plate two small pieces of gold, which shall extend to and bear upon the tooth at opposing points.

Dr. Knowlton thought that the springing of rubber plates was owing either to undue pressure in bringing the flask together, or the removal of the work before sufficiently cooled. He thought that a great excess of rubber was apt to ruin work, in the effort to force together the sections of the flask.

Adjourned.

THIRD DAY.—*Afternoon Session.*

Called to order at two P.M.

Dr. Taft recommends to a patient that which he conceives best adapted to the case. He had been in the habit of lining the lingual surface of rubber plates with gold; but intended to try the gold wire or gauze net framework.

The greater part of the afternoon was consumed with a clinical demonstration by Dr. Atkinson.

The following resolution was offered by Dr. Magill:—

Whereas, In the opinion of this Convention, business will be more promptly accomplished by the preparation of papers upon regular subjects of discussion, rather than by extemporaneous effort;

Resolved, That we request of those who intend to meet with us in the next annual convention, to examine carefully the subjects offered, and to the best of their ability prepare well-digested articles, confining themselves carefully to the subjects under discussion, and to forward such papers to be read in Convention, in case they cannot attend in person. Carried.

Dr. Allport offered the following:—

Whereas, In the opinion of the American Dental Convention, no less than two years pupilage in the office of a competent dentist, and attendance upon two full courses of lectures in a dental college, will qualify an individual to practice dentistry properly; therefore

Resolved, That practicing dentists be requested not to receive students into their offices for a less time than two years; and under no circumstances, unless they will agree to attend lectures in and be graduated from a dental college, before entering upon the practice of the profession.

Resolved, That the people should require of all those who hereafter enter upon the practice of the profession, that they shall have received a diploma from a dental college as the first requisite for public confidence and patronage. Carried.

Dr. Benedict was glad to have had the Convention honor the City of Detroit with a visit, and hoped to see the State of Michigan well represented at Chicago, in the month of July, 1865.

Dr. Buckingham moved that the Convention extend a vote of thanks to those of the profession of Detroit who have taken an interest in our proceedings. Carried.

Dr. Spalding moved a vote of thanks to the Judge of the Supreme Court, for the privilege of meeting in the room used for the sittings of that honorable body. Carried.

Upon motion, adjourned to meet at White Sulphur Springs, Ohio, on the first Tuesday of August, 1865, at ten A.M.

ALBANY DENTAL ASSOCIATION.

THIS Association was organized January 15th, 1864, and the following officers elected for the ensuing year:—

President.—Dr. Robert Nelson.

Vice-President.—Dr. J. A. Perkins.

Recording Secretary.—Dr. Wm. F. Winne.

Corresponding Secretary.—Dr. B. Wood.

Treasurer.—Dr. E. Griffin.

Executive Committee.—Drs. B. Wood, J. C. Austin, and W. F. Winne.

The Association meets monthly, at the office or residence of one of the members, the first Friday of each month. The meetings have been regularly held, and no failures for want of a quorum; and have been conducted with uniform harmony and good-will.

At the meeting of July first, Drs. J. A. Perkins and B. Wood were appointed delegates to the American Dental Association.

WM. F. WINNE, *Recording Secretary.*

EDITORIAL.

FREAKS OF NATURE.

WE respectfully acknowledge the receipt of three small teeth, of irregular formation, resembling cat's front teeth, by the politeness of Dr. Freeman Crossett, of Sonora, California. They were extracted, as he informs us, from the situation where a central incisor ought to have been. These cases do occur, and in fact it is remarkable how frequent we find malformations of the front teeth, and also supernumerary teeth of a large and rude formation, posterior to well-formed front teeth. We had often thought of giving a history of a number of those cases which have occurred to us, as well as specimens with which we have been favored by different members of the profession.

An inferior molar tooth, with three fangs, by the politeness of Dr. Geo. W. Hawke, of Whitby, C. W. He says that, during a practice extending over eleven years, it is the first he has met with. These cases are not unfrequent, and sometimes become very difficult to extract. Another, and still more interesting case, from Dr. G. F. Barnes, of Allentown, Pa. It is a specimen of the osseous union of the roots of two inferior molar teeth, in one of which the crown is decayed away; but the roots of both are morbid. We have a number of these specimens, which have been presented to us by different members of the profession, for which we return our grateful thanks. These roots have a coating of exostosis diffused over them, which seems to be the bond of union. We can understand how two bony tissues, of similar structure, may unite; but we have never seen the union of dentine with the alveolar process, but have heard it talked about. There is often a very strong fibrous structure of the periosteum, uniting the root with the alveolus, which is mistaken for bony.

Dr. A. F. Davenport has also sent us a very interesting specimen. It is a *double* or twin lateral incisor, left side, upper jaw. They look as nearly alike as possible, and are united from near the cutting edges to about an eighth of an inch below the gums. The enamel of the one is fused into the other, so it is not through the medium of cementum, as is probably the case when extremities of roots are united. J. D. W.

SENSITIVE DENTINE—ARSENIC, AND THE TREATMENT OF THE DENTAL PULP.

IN my speech, in defense of the use of arsenic, before the "American Society of Dental Surgeons," I said: "I have no objections to the use of the cauterizer. I have no preference for arsenic, except that it is the most deadly poison I can lay my hands on. If you can give me something that will do it faster, (destroy the pulp,) I will take one share in that stock. The great object is to manipulate without giving pain; and I find that I give less pain by using the arsenious acid." At that time (1851) I stated the object was to *manipulate without pain*. I hold that still to be the object in treating sensitive dentine, or an exposed pulp. A dentist who operates regardless of the pain he inflicts, even though he accomplishes his purpose reasonably well, is not a properly qualified dentist; he is *morally deficient*. Even if he condoles and sympathizes with his patient, and still persists in inflicting the pain, the dereliction of duty is the same. In this respect, we contend for the use of *palliatives*, whether they be arsenic or simple water, upon considerations of common humanity. I will leave this part of the subject, and go back to the winter of 1839, and to the history of the use of arsenic. A medical student, Mr. Curtis, by the recommendation of O. S. Fowler, phrenologist, called to get the central incisors treated; they were decayed on the anterior surfaces near the gums, the cavities not very deep, but exquisitely sensitive; his teeth were projecting, and the lip pressed tightly over them. He informed me that several attempts had been made to plug them, but he could not bear the operation. I applied dry arsenious acid as finely powdered as possible. I secured the arsenic, by placing a lock of cotton over it, and tying the cotton by throwing a ligature around the tooth, requesting the patient to call the next day. He did so, and I was enabled to cut out the cavities sufficiently to plug them both at one sitting; the progress of the decay was arrested. This gentleman met a friend, a member of the Legislature of New Jersey, and now a distinguished member of the Corn Exchange, of this city. He was aware that his friend had endeavored on several occasions to get his teeth plugged, but failed. He accordingly advised him to call and see me; I found ten cavities required filling; the patient was very nervous about operations on his teeth, and the teeth were so tender, he could not bear them to be dried out with cotton. I placed some dry arsenic in the cavities, all at one sitting. Some were decayed between, and some on the anterior surfaces. The upper and lower canines, on the anterior, were intensely painful to the touch; a number of the cavities were plugged the next day, and the rest at a subsequent visit. This patient remarked that "forty dentists" had tried to plug his teeth, but no one had succeeded. I doubt not but the estimate of the number of dentists was high. His

family is large, and his circle of friends; I have treated hundreds of cavities for them since, and all in a similar manner.

It has been said, that all teeth treated with arsenic eventually die and turn blue. This is not true, unless too much is applied, and left in contact too long and applied improperly; or in cases where it is not indicated. These are questions of the deepest importance. I seldom use creosote, arsenious acid, and morphia, for sensitive dentine: the creosote permeates the tooth bone too rapidly, and not carrying with it sufficient arsenic to destroy its vitality, it only irritates the bone, or, permeating to the pulp, only irritates it and exalts the sensibility of the dentine of the entire tooth. Besides, if a tooth does not yield to a first application, it is better to wait a few days before applying it again, as it not unfrequently happens that, by waiting, the tenderness will subside in a few days; while pushing the application every day, too much is applied, and the whole tooth becomes saturated. This is especially true when the creosote and arsenic are applied. The dry arsenic is preferred, because experience teaches that it acts locally, or, in other words, can be kept longer in contact with a part without being absorbed so deeply as when combined with the essentials oils. With our present knowledge of the tubular structure of the tooth bone, who could be found incautious enough to persist in the application of a poison to it, without endangering finally the death of the whole structure? Wherever mischief occurs in the treatment of dentine, it is from a want of having formed a correct diagnosis of the case, ignorance or carelessness of the permeability of the part to which it is applied.

The foregoing detailed cases fully confirmed us in the *necessity* of the use of arsenic for treating sensitive dentine. I used faithfully the actual cautery, but could not succeed with it, and its application was intensely painful. Nitric acid, muriatic acid, caustic potash, nitrate of silver, and many other substances were used in turn, and while experimenting with arsenic, but without satisfactory results, up to until eighteen years ago, when I used chloride of zinc to advantage. There is no doubt but in the aggregate, more damage has been done in the early history of the use of arsenic than good; because it is not unreasonable that dentists became acquainted with the *fact* that it was used more rapidly than they became acquainted with the proper knowledge of *how* to use it. Dr. Arthur's statement before the American Society fully illustrates that supposition.

J. D. W.

(To be continued.)

PUBLISHER'S NOTICE.

In order to furnish a full report of the National Association and Convention, twenty-four pages have been added to the present number, and notwithstanding this fact, we have been compelled to lay over the papers of Drs. Atkinson and Barker, with other matter, until our next issue.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

THE DENTAL REVIEW, LONDON—APRIL.

"THE DEVELOPMENT AND OSSIFICATION OF THE SUPERIOR AND INFERIOR MAXILLARY BONES. By ROBERT T. HULME, M.R.C.S., F.L.S.—A complete account of the anatomy and physiology of the superior and inferior maxillary bones, from their earliest appearance in the embryo until old age, is not to be met with in the works on descriptive anatomy. The inquiry involves several interesting and disputed physiological questions, whose solution must be sought in a series of original memoirs, all relating to different parts of the same subject, but which have not as yet been interwoven into one continuous history.

"The origin and development of the maxillary bones have long been a matter of discussion among the most careful and patient investigators. The early period of embryonic life at which these bones make their appearance, the number of different points from whence ossification proceeds, and the rapid manner in which the ossific centres become united, have all added to the difficulties and obscurity by which the inquiry is surrounded. The changes the bones undergo in relation to the successive development and eruption of the temporary and permanent teeth are equally remarkable with their complicated and peculiar mode of development. The researches of Rathke, of Reichert, and of Coste on embryology; of Guillot, and of Magitot and Robin on the development of the teeth; and the recent work of MM. Rambaud and Ch. Renault on the origin and development of the bones of the skeleton, have combined to elucidate the several points in question, and to prepare the way for a clear and connected history of the origin and development of these bones, in which the dental physiologist is so deeply interested. We propose, therefore, to avail ourselves of the labors of the authors whose works are referred to at the commencement of this paper, and to attempt a general description of the origin of the maxillary bones in man, and of the different phases through which they pass from their first appearance in the embryo to their completion. * * * * *

"There are two important points in the organization of the superior maxillary bones which should be borne in mind in considering their origin and growth. The one is the gradual formation of the maxillary sinus or antrum, with the development of the permanent teeth; the other, the relation which that portion of the completed bone, containing the incisor teeth, bears to the separate bone of the lower mammalia, termed the incisor, or intermaxillary bone.

"Two opinions have been held by anatomists with regard to that portion of the maxillary bone which corresponds to the incisor bone of the lower mammalia. According to some there is no trace of the incisor bone in man, and its absence constitutes an anatomical distinction between him and the remainder of the mammalia; others maintain that, although the evidence of the separate existence of this bone in man is speedily obliterated, yet, at an early period of embryonic life, such a condition of the parts may be observed as justify us in regarding it as a separate growth.

"M. Rousseau, the conservator of anatomy in the Museum of Natural

History at Paris, is a strenuous supporter of the first view. This writer cites numerous authorities in support of his opinion; he challenges the production of any specimens proving the existence of an intermaxillary bone in man, and endeavors to confirm his statements by evidence derived from comparative anatomy. 'If,' he remarks, 'I have insisted upon a point which, to the superficial thinker, is of little importance, it is because, like Camper, I maintain that it constitutes a distinction between man and the Apes, with whom it has been attempted to associate him. The position I hold at the Museum of Natural History, and the duties I am called upon to perform, have compelled me to examine a large number of specimens of all ages, and derived from numerous species. I have, moreover, been enabled to make certain observations which have escaped the notice of others. In all the mammalia, without exception, I have found the intermaxillary bone; in man only it is wanting. If Blumenbach did not detect it in certain apes, whose skeletons he examined, it was in consequence of the individuals having arrived at that age when the bone becomes united with the maxillary.'

"Those who are opposed to this opinion and believe that evidence of the existence of an intermaxillary bone is to be found in man during embryonic life, refer to the presence of a suture, which may be seen at birth and for some time after, extending from between the sockets of the lateral incisor and of the canine, from whence it is continued through the anterior part of the palatine process of the superior maxillary bone to the incisor foramen. The situation of the fissures in double hare-lip and the separation in some of these cases of a central portion of the bone corresponding to the incisor teeth, have also been regarded as supporting this view. Dr. Leidy* has, indeed, recorded an instance in which he found the intermaxillary bone entirely separable in an embryo one inch eleven lines in length. This, however, must be admitted to form an exceptional case.

"Dr. Webb, in his valuable notes to 'Hunter on the Teeth,' thus sums up the different periods at which the union of the maxillary and intermaxillary bones takes place in man and the Simia: 'Anchylosis between the superior and premaxillaries takes place, sooner or later in life, in the typical *Quadrumana*. In the Chimpanzee, the facial portion of the maxillo-intermaxillary suture disappears at or about the period of the first dentition; in the Orangs, the suture remains until the development of the great canine teeth; in the *Semnopithec*i and *Inui*, the separation continues distinct until the period of old age. In man, on the contrary, the process of anchylosis (with the exception of a portion of the suture on the palate, which usually remains until after birth) is completed before the termination of intra-uterine existence.'†

"If we turn to our text-books on anatomy, we find that these authorities are divided in opinion upon this point. Quain, after mentioning the grounds upon which those who maintain the existence of an incisor bone in man base their opinion, concludes by observing: 'In the present state of knowledge, therefore, the existence of an incisor bone in the human body at any period cannot be admitted.'‡

"Holden, in speaking of the centres of ossification, from whence the superior maxillary bone is developed, merely says: 'There is one part,

* Proceedings Academy of Natural Sciences, Philadelphia, January, 1849, p. 145.

† Dental Review, vol. iii. p. 2.

‡ Elements of Anatomy, by Jones Quain, M.D., p. 66, fifth edition. London, 1843.

however, which is certainly ossified from a distinct centre, namely, that which contains the sockets of the two incisor teeth. In animals this remains a permanently distinct bone, called the "premaxillary." Indeed, in most human skulls, if not very old, one can trace the remains of the premaxillary suture.* Gray, in his *Anatomy, Descriptive and Surgical*, when describing the development of this bone, makes the same remark."

The above extracts are offered on account of the interesting question which is prominently presented relative to the presence of the *intermaxillary* bones in the human being. From the days of Galen,—who was the first to describe these bones in connection with the human maxillæ,—this subject has been a theme of contention among anatomists. Vesalius, who opposed the teachings of Galen, declared that "his anatomy was based upon the dissection of animals, and not that of the human body." As evidence of this, he said that "Galen indicates a separate bone, connected with the maxillary by sutures; a bone which, as every anatomist can satisfy himself, exists only in animals." The followers of Galen defended the position assumed by their great teacher, and among them Sylvius asserted "that man *had formerly* an intermaxillary. If he has it no longer, he *ought* to have. It is luxury, it is sensuality which has gradually deprived man of this bone." This dispute was continued for centuries, until at last it was taken up by Goethe,—that universal genius and worker,—who combined, in a wonderful degree, the philosopher, the poet, the man of science, the novelist, the essayist, etc. LEWES, in his *LIFE OF GOETHE*, referring to this subject, says:—

"The most remarkable point in this discovery is less the *discovery* than the *method* which led to it. The *intermaxillary* bone in animals contains the incisor teeth. Man has incisor teeth; and Goethe, fully impressed with the conviction that there was *unity in nature*, boldly said, if man has the teeth in common with animals, he must have the bone in common with animals. Anatomists, lost in details, and wanting that fundamental conception which now underlies all philosophical anatomy, saw no abstract necessity for such identity of composition; the more so, as evidence seemed wholly against it. But Goethe was not only guided by the truer philosophic conception—he was also led to the true method of demonstration, namely, the *comparison* of the various modifications which this bone underwent in the animal series. *This method has become the method*; and we require to throw ourselves into the historical position to appreciate its novelty at the time he employed it. He found, on comparison, that the bone varied with the nutrition of the animal and the size of its teeth. He found, moreover, that in some animals the bone was not separated from the jaw; and in children the sutures were traceable. He admitted that, seen from the front, no trace of the sutures was visible, but on the interior there were unmistakable traces."†

The *facts* here presented are incontrovertible, and will be readily sus-

* Human Osteology, by Luther Holden, F.R.C.S., p. 91, second edition. London, 1857.

† The Life and Works of Goethe, vol. ii. p. 139. By G. H. Lewes.

tained by observant anatomists. The line of demarkation between these bones can be readily demonstrated on the palatine surface in the majority of young jaws, and I have in my possession specimens in which the palatine sutures between the *maxillary* and *intermaxillary* bones are not only evident in foetal but also in adult jaws.

One remarkable fact in connection with this discovery of Goethe is that, although "it was at first received with contemptuous disbelief, even by men so eminent as Blumenbach, and was forty years gaining general acceptance," it was the first step taken, and the means whereby the present universally-accepted system of *anatomical philosophy* was established, which recognizes the *analogy* or *homology* of form and structure that prevails in the different organs of the various orders of animals, and upon which is based the conviction that a *general plan of organization* or *unity* exists throughout the entire animal kingdom. As proof of this, Owen says:—

"Goethe, indeed, had taken the lead in inquiries of this nature in his determination, in 1787, of the homology of that part of the human upper maxillary bone which is separated by a more or less extensive suture from the rest of the bone in the foetus; and the *philosophical principles propounded in the great poet's famous anatomical essays called forth the valuable labors of the kindred spirits, Oken, Bojanus, Meckel, Caras*, and other eminent cultivators of anatomical philosophy in Germany."*

This is valuable and authoritative testimony, coming, as it does, from a master-worker in this direction.

Carpenter, who makes no allusion to Goethe as the originator of the vast field of investigation thus opened, and indeed appears to be unacquainted with his claims, as he credits a much later worker and *follower*, with promulgating the system, says:—

"Of all the means of discovering the structural relations of organs, the study of their *development* is the most important; since this, if carefully pursued, will probably never fail to clear up whatever doubts may be left by other modes of investigation. It is in this manner that the true solution has been at last attained of many of the most difficult and most controverted questions in science—questions which have reference not merely to the nature of particular organs, but to the relations subsisting between different groups of living beings. And it is in this path, therefore, that the philosophic naturalist can press forward with the most assured prospect of success in the search for that *general plan* of organization which it is his highest object to discover.

"Thus we are led by the study of *morphology* (that is, by the recognition of 'homologous' organs, under whatever forms they may present) to the perception of the great general truth, which is perhaps the highest yet attained in the science of organization, and which is even yet far from being fully developed, that in the several tribes of organized beings we have not a mere aggregation of individuals, each formed upon an inde-

* Archetype and Homologies of the Vertebrate Skeleton, p. 3. Prof. R. Owen, F.R.S.

pendent model and representing a type of structure peculiar to itself, but that we may have through each assemblage a *conformity to a general plan*, which may be expressed in an 'archetype' or ideal model, and of which every modification has reference, either to the peculiar conditions under which the race is destined to exist, or to its relations to other beings."*

No one can question the sound philosophy of these views or the direct bearing which they have upon the subject under consideration; and it is difficult to conceive how any one, viewing it from such a stand-point, can doubt the rudimental existence of the *intermaxillary* bones in the human *fœtus*. Organs which serve an important purpose in some animals and not in others, or in one sex and not in the opposite, are frequently, and with some organs almost invariably, presented in a rudimental state. The mamma of the human female and its rudimentary prototype in the male, is the most familiar and conclusive evidence of this, and it is a widely and well recognized fact "that, if the plan of structure in a particular tribe involves the *non-development* of some organ which is possessed by neighboring groups, its conformity to archetypal regularity is generally manifested by the presence of that organ in a *rudimentary* or undeveloped condition. * * * * Thus the rudiments of teeth, which are never developed, and which at a later period cannot be detected, are found in the embryo of the whale, both in the upper and lower jaws; and Prof. Goodsir has ascertained that the rudiments of canine teeth and of the incisors of the upper jaw, which are not subsequently developed, exist in the embryos of Ruminant mammals."†

If this is true of the teeth, why is not the same thing true of the *intermaxillary* bones of the human *fœtus*? That it is so, we have the positive testimony of Prof. Leidy; and, as reference is made to his specimen by Mr. Hulme, it is but simple justice that his description of it should be presented. It is as follows:—

"The *intermaxillary* bone, as a distinct piece in man, I have detected existing in embryos of about the ninth or tenth week. (A good deal of uncertainty existing relative to the age of embryos, I will further add, that it measures one inch eleven lines from heel to vertex, the lower extremities being stretched out.) At this period, ossification has already advanced in the superior maxillary and *intermaxillary* bones sufficiently to give them a determinate form. The greatest breadth of the two bones in apposition is one line and two-thirds. The greatest height, being at the ascending or nasal process, is one line. They present a facial portion, consisting of the ascending or nasal process and part of the body of the bones; an alveolar ridge, and groove, and a palatine process projecting backward from the superior maxillary bone. The two are easily separable at this period, and the articulation passes through the alveolar ridge at a point corresponding to the separation between the incisor alveoli and the canine alveolus, and extends transversely inward behind

* Principles of Comparative Physiology, p. 40. By W. B. Carpenter, M.D., F.R.S., F.G.S.

† Principles of Comparative Physiology, p. 129.

the incisor alveoli, and vertically upward, dividing the nasal process into two nearly equal portions. On the posterior surface of the nasal process the articulation is at the bottom of a comparatively deep and wide groove. The preparations exhibiting these points, which have been the subject of so much discussion, I have carefully preserved, and upon exhibiting them to the Academy of Natural Sciences, the members were fully convinced that the facts are such as I have just stated.—J. L.”*

The specimens, of which the above is an accurate and faithful description, are at present in the Museum of the University of Pennsylvania, where I have had an opportunity of making a careful examination of them in company with Prof. Leidy.

The important subject of *Homology*, incidentally touched upon above, is one of the most attractive and instructive which can engage one's attention, and the prominent part which the teeth occupy in such investigations, and the fact that this study had its origin in a mooted point relative to the formation of the human jaw, should tend to make it peculiarly interesting to those students of dental science who desire to be doing something more than constantly repeating themselves, by the publication and republication of the same ideas, clothed in the same language, year after year; no progress, no advancement, but, like a blind horse in a mill, constantly running round the same circle.

—
 “THE DENTINAL TISSUES NOT DISINTEGRATED AND RENOVATED.”—
 In the “Periscope” of the May (1864) number of the DENTAL COSMOS an extract is presented from one of a series of lectures delivered at King's College, London, by Dr. Lionel S. Beale, on the Anatomy of the Elementary Tissues of Man, in which the following views are advanced, as will be observed, in the most emphatic and positive manner:—

“These dentinal tissues of all the textures in the body are those which undergo the least amount of change, and the statement that the material of which our teeth is composed is being continually removed and renewed, is a mere assertion, and utterly unsupported by facts or by sound argument.

“It has often been asserted that *all tissues* in the organism undergo constant change during life; but this statement is only in part true. Nevertheless, observers have, one after the other, received it in its widest signification, and, accepting the dictum as true, have allowed inferences derived from actual observation to be modified by it. Thus it has been asserted that both bone and teeth have a system of tubes through which *new particles* are carried to all parts of the structure to replace the *old ones* which are removed by the same channels. But I will assert the very contrary, and I am sure no one will contradict me when I say that the very particles of calcareous matter which exist now in the enamel and dentine of our teeth will be there until they are destroyed by disease, worn away by friction, or removed bodily by extraction. It cannot be too distinctly stated that there are tissues in the body which are so slowly changed that it is not possible to demonstrate that they change at all,

* Sharpey and Quain's Anatomy. Edited by Joseph Leidy, M.D., p. 143.

save in undergoing some degree of condensation after their formation, and there is matter which seems to be destroyed as fast as it is produced—probably so very fast that we cannot even obtain for examination the matter itself, but only the substances which result from its decomposition. Between these two extremes there are tissues which exhibit very different rates of change. There is no evidence of addition and removal of material going on in the enamel and dentine after the completion of their formation, and it is probable that the matter upon which the hardness of these tissues depends is not removed at all after its deposition.”

Notwithstanding the very decided manner in which the above is communicated by Dr. Beale, whose industry and devotion to his specialty entitle his opinions to be treated with due respect, the position assumed by him cannot be considered by any means as unquestionable.

With regard to the view generally entertained by physiologists, that there is a constant change taking place in *all* the tissues during the life of a being, there is little room for doubt that, with the exception of the enamel after it is fully formed and the consolidated dentine of very old persons, the universally received opinion is the correct one.

It is only necessary to refer to the absorption of the fangs of the deciduous teeth, (a retrograded metamorphosis by which the dentine and cementum are removed cell by cell, as in their original construction they were formed cell by cell,) to disprove the assertion of Dr. Beale, that *“there is no evidence of addition and removal of material going on in the enamel and dentine after the completion of their formation, and it is probable that the matter upon which the hardness of these tissues depends is not removed at all after its deposition.”*

It may be said that he did not intend to include the deciduous teeth. The statement, however, is made broad and sweeping, and without the slightest evidence of reservation in any direction.

The indication of molecular change in the dentine and cementum is by no means, however, confined to the deciduous teeth. Frequent and well-marked instances are brought to the notice of the dental practitioner in which teeth, originally soft in their structure and cutting readily under the instrument, become, in course of time, very hard and compact; while, on the other hand, teeth which have been quite hard become very soft and chalky. That this change of structure is due to constitutional influence, and is brought about by molecular disintegration in the part affected, is a more than reasonable supposition, for it bears upon its face an almost positive certainty. Women, for instance, who, prior to pregnancy, possess excellent, strong, and hard teeth, are frequently found to have them changed in a marked degree after that period, and to assume a softened condition. It is a fair presumption that the demand made upon the mother, during the period of utero-gestation, for the phosphates and carbonates of lime, has much to do in bringing about this condition. It is well known that the osseous system is frequently affected under

such circumstances, and in a material degree, the bones becoming soft and pliable, or very brittle, and fracturing from the slightest cause.

These, however, are not the only changes which take place in the structure of the permanent teeth. It is well known, for instance, that exostosis of the fangs or *hypertrophy* of the cementum is a very common occurrence; the reverse of this, or *atrophy* of the fangs, although by no means common, is yet frequently presented to observation; and practitioners who have had years of experience can recall cases that have come under their notice where teeth, which, while connected with the alveolus, gave, both from the appearance of the teeth and the age of the patient, every indication of having the usual sized fang or fangs, after extraction have been found in an extremely atrophied condition. The fact of the pulp cavities being very small or entirely obliterated, and the material structure presenting every appearance of having been removed from *without inward*, forbid the supposition that these were cases of arrested development of the fangs, and indicate, beyond a question of doubt, that they are illustrative of the fact that retrograde metamorphosis can and does take place in the dentine or cementum of the permanent teeth.

If Dr. Beale had been familiar with facts like these, it is possible that he would not have indulged in such sweeping and positive assertions. Under any circumstances, it is not only a duty we all owe to science, but it is also more prudent and much safer to present any objection which we may have to advance against long-established and universally adopted views in a suggestive rather than in a dogmatical manner.

DENTAL REGISTER OF THE WEST—AUGUST.

“SUCCESS.—The definitions applied to the term are very various. It is ordinarily defined to be the accomplishment of any special object upon which effort is concentrated. This, perhaps, is correct, so far as individual objects are concerned. With those who look no farther than this it is easily attained. But success in life is a matter of far more magnitude than this. It includes the blending together, in one harmonious whole, a great variety of objects and actions, and drawing from each and all the greatest and best results. Nothing less than this would we regard as success in life.

“Now, what is professional success? In answering this, the rule we have just enunciated is the guide. He only can attain success, as a professional man, who lays hold upon and uses every opportunity and circumstance for the accomplishment of large and beneficent results.

“Many regard it as the great object of life to accumulate money. The world says, he who has obtained wealth has made life a success; and this, too, regardless of the means by which it was obtained. This alone is *not* success.

“In our profession, what is worthy of the appellation success? Certainly not merely to gain money. Though the possession and proper employment of money is an important particular, yet it is not the chief nor one of the chief. The man who, by the practice of his profession, makes it his chief aim to accumulate wealth, though he does that and that only, is not successful. Neither is he successful whose highest object is

to secure a large practice. One may have all this, and do comparatively little good for humanity. Neither is he successful whose aim is no higher than to become a fine operator, though it is one important element of success.

"He only is successful who accomplishes, through a high and holy purpose, the largest amount of good to the greatest number of his fellow-beings. Money, business, reputation, and ability are all important elements of success; yet no one of them, nor all together, will constitute success in the full sense. Something beyond all these must be accomplished in order to attain perfect success.

"The obligations of the dentist are threefold, viz.:—

"Those due to himself. Those due to his patients. And those due to his profession.

"Every one imagines that he can at once decide what is due to himself, and what would be best; but such decisions are aside from the mark just in proportion as the person is influenced and controlled by selfish and contracted views, opinions, and practices. He whose influence for good is most outreaching and most effective is the one who secures the largest revenue of happiness. Here is the principle by which to solve the problem of our duty to ourselves.

"Our duty and responsibility to our patients will be readily comprehended when we have made this first step.

"However well we may conclude we fulfill our obligations to ourselves and our patients, we all must feel that our obligations to our profession are at least but poorly performed. In the fulfillment of these, we should not do it as some pay an old debt, grudgingly, and for fear lest we should over-pay a few fractions; but let this work be entered upon with unbounded liberality; let every one bring in abundantly as he has been blessed, and then he shall be made fat. Let no one measure to give just an equivalent for what he has received. No one should conclude that he has but little influence, and could do but little, and therefore do nothing. If we can do but little, do *that*. Let every one use his influence and ability for the best interest of his profession—to direct it in the right channel—to make it in every sense better. No one is successful who fails in these things.

"An operator, by the practice of his profession, may be the means of good to hundreds of patients; yet, in addition to this, if he can reach, and by his efforts make better operators of ten or a hundred of the professional brethren, his efforts for good to his fellow-beings will be correspondingly increased.

"It is the efficient employment of influence and ability in this and like channels that makes the professional man successful. T."

COL. JOHN R. LEWIS.—The subject of this sketch came to Buffalo, New York, in the year 1849, from Edenborough, Pennsylvania, the place of his nativity, and entered the office of his uncle, Dr. John Lewis, as a student of dentistry. During a pupilage of five years, he attained to great proficiency, and evinced a remarkable aptitude in his chosen profession. Feeling the want of further advancement, such as could not be gained in an office, he entered the Pennsylvania College of Dental Surgery, in 1857-58, and graduated with honors. Shortly after leaving college, he entered into partnership with Dr. James Lewis, of Bur-

lington, Vermont; and while there, desiring to gain a still more extended acquaintance with the science of his profession, he attended the regular course of lectures, and graduated in medicine at the University of Vermont.

Responding to the first summons of his country, in the memorable April of 1861, he unhesitatingly threw to the winds a prospering practice in his profession, and shouldered a musket in the ranks of one of the first regiments raised in Vermont. At the expiration of its three months' term of service, he immediately raised a company for three years' service, and re-entered the field as a Captain in the 5th Vermont. His subsequent promotion was remarkable. He was raised to the Majority of the regiment over five senior Captains, at their own unanimous request, and without knowledge of the movement in his favor until the commission reached him. We know of no other such instance of promotion in the history of the war. The Lieutenant-Colonelcy of the regiment soon followed, and with that rank he has had actual command of it for more than a year. The recent confirmation of its Colonel (Grant) as Brigadier-General, gave him his proper rank.

Colonel Lewis was wounded in the battle of the Wilderness, which has necessitated the amputation of his left arm at the shoulder. He has been through all the campaigns of the army of the Potomac, and prominently participated in all its battles, his regiment belonging to the famous fighting Vermont brigade. Until now he has escaped injury. At last he has been called upon to give a brave arm to the cause which it has so nobly upheld.

T. G. L.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"Catalysis as a Chemical, Physiological, and Pathological Process. By JOHN REID, M.D., of Chicago, Ill.—Catalysis is a term used to designate the changes produced among the proximate and elementary principles of a compound, by virtue of the presence, merely, of a substance which does not of itself enter into combination with them. In ordinary chemical reactions the substances brought together undergo mutual decomposition, and in the new combinations which take place all traces of the original compounds disappear. On the contrary, in catalytic changes, the active agent of the process contributes nothing of its own composition or elements to the substances acted upon; its mere presence being sufficient to induce them. No explanation can, in the present state of our knowledge, be given of the nature of the force thus brought into exercise, and hence, perhaps, the propriety of the designation employed, which simply expresses the action of 'presence' in inducing decomposition.

"The essential conditions of its action are, first, the presence of a compound substance capable of undergoing change; and second, the contact

of a substance capable of exciting or setting those changes in motion. It is not necessary to the idea of catalysis that the catalytic agent should itself remain unchanged. This may or may not occur. Thus, where an inorganic compound, as sulphuric acid, is the catalytic, no alteration takes place in it. On the other hand, when it is an organic principle, in most cases, perhaps in all, changes originating in it constitute the first and essential part of the process.

"The class of phenomena comprehended under this term, though obscure, is yet an extensive one, and of common occurrence. It is not limited to any particular set or group of substances. It may be seen in the inorganic kingdom in the action of one inorganic body upon another. Also in the action of an inorganic on an organic substance. It is most abundantly and familiarly developed in the action of azotized substances on each other, and on other organic substances, as in ordinary fermentation and other analogous changes. It also comprehends a large and most important class of vital phenomena, as the digestion of food, and probably its ultimate assimilation in the tissues, and the varied metamorphoses occurring there. In various pathological states we witness its direful operation, even in the mildest phases of its action, in contamination and perversion of the animal fluids, in disturbance of all the functions of life, and in its graver operation a suddenness of dissolution which no other morbid agency can rival.

"It will be the object of this paper to show the operation of the catalytic force in the various departments mentioned, with a view to a clearer comprehension of its agency in the induction of what are called zymotic and catalytic diseases.

"I will then first glance briefly at its operation among inorganic substances. It is well known to the chemist that oxygen and hydrogen may be kept mixed for any length of time at common temperatures without combination taking place. But on addition of platinum, either finely powdered or in the sheet, combination immediately commences, and water is formed. It is unnecessary to say that the platinum contributes nothing beyond its mere presence to this result. Other metals, as palladium and gold, and even glass, possess the same power, though in inferior degree. Second. If a little finely powdered peroxide of manganese is added to chlorate of potassa, and a gentle heat applied, oxygen will be set free at a far lower temperature than when chlorate of pot. alone is used. All the oxygen comes from the chlorate, which is completely decomposed, while an entirely different substance, the chloride of potassium, is formed. The peroxide of manganese remains entirely unchanged. Many other illustrations might be given of the operation of catalysis among inorganic compounds, but these will be sufficient. I will now proceed to show that inorganic substances not only induce catalysis in others of the same class, but that some of them have the remarkable property of inducing it in organic substances.

"Thus, dilute sulph. acid, with the aid of moderate heat, converts gelatinous starch into dextrine, a substance having different physical properties, but identical chemical composition. On the application of greater heat, the dextrine is transformed into glucose or grape sugar.

"Again, cane sugar in solution with sulph. acid, is rapidly changed into glucose, a substance of different though allied composition, and possessing physical and chemical characteristics of an entirely different kind. Six equivalents of oxygen and six of hydrogen have, by decomposition of the

water present, been added to the composition of the original substance introduced. In both these experiments, the sulph. acid remains of course unchanged and undiminished.

"These transformations are precisely what take place in the digestion of starch and cane sugar in the human body, where the gastric fluids and intestinal juices take the place of the sulph. acid in the experiments with corresponding results.

"The action of many of our most valued and potent remedial agents, as mercury, iodine, arsenic, and others, are obvious instances of catalysis. No other remedies produce more decided and positive effects than these, yet they undergo no decomposition in the process, and are cast out unchanged.

"The beneficent influence exerted by these agents in many forms of disease, and their equally destructive powers in cases unsuited for their administration, affords a wide and familiar field of observation, and present some of the most striking instances of the catalytic power of inorganic over organic substances.

"Facts of this kind have many interesting physiological and pathological bearings, and can hardly with propriety be excluded from our consideration, when we remember how largely and intimately inorganic substances enter into the composition of the human body, and the extent to which they may be introduced in the various ingesta and as medicines. Sulphur, we know, forms an essential part in the composition of all the protean substances, being incapable of complete separation from them, without destruction of the organic substance, and most of the various azotized principles which make up the bulk of the human body, are characterized by the presence of various inorganic substances which are essential to their composition. That their presence is essential, is proved by their constancy as well as by the intimacy of their combination, and it cannot be doubted that they take an important part in the metamorphosis of tissue. Whether the influence they exert is by that of ordinary chemical attraction, or that of catalytic power, cannot as yet be positively stated; but that it is by the latter is not an improbable assumption, in view of the facts which I have stated, and many others which might be presented.

"It is, however, among organic substances that the operation of catalytic force is more particularly and familiarly seen. One class of these, the non-azotized, though permanent under ordinary circumstances, are characterized by a special aptitude to undergo decomposition in the presence of a catalytic or ferment. The other, the azotized, are equally characterized by the property they all enjoy in an extraordinary degree, when in process of decay, of exciting these changes in proximate principles and in each other. Hence their designation in reference to these changes of catalytics or ferments. The most familiar illustration of these facts is seen in the process of fermentation. A solution of sugar in water has no tendency to ferment; but on introducing an azotized body, as gluten, the process is immediately set in motion, resulting, as we all know, in the transformation of sugar into alcohol and carbonic acid, the gluten undergoing change, but contributing nothing of its elements to this result.

"The substance yeast, usually employed in the fermentation of beer, is dependent for its powers on the gluten it contains. Examined under the microscope, it is found to abound in minute transparent vesicles containing granules, which are believed to be living infusory plants, which have

the power, and do actually propagate themselves, at expense of proximate principles in the solution, in which they induce fermentation. We have thus two processes going on side by side in the solution, a change in the ferment which impresses similar changes upon all proximate principles present, assimilating them to its own nature, and decomposition of the sugar, out of the elements of which alcohol and carb. acid are formed.

"Fermentation, then, as we have seen, is but a catalytic process. The same conditions are required for its development, and the results are of the same kind.

"The visible extrication of carbonic acid gas occurs in vinous fermentation; but this extrication is not essential to the idea even of fermentation. In the case of acetous fermentation, although, as often conducted, carbonic acid is given off, it is not essential, (fixation of oxygen from the air being the essential change,) and in the improved processes of forming vinegar from alcohol it does not take place.

"The conversion of glucose and milk sugar into lactic acid under the action of a ferment, is as true an instance of fermentation as the conversion of cane sugar into alcohol and carb. acid. The state of intestine motion and change which the term fermentation requires, is met in the decomposition, altered relation of atoms, and change of structure which takes place. * * * * *

"In the saliva of man there is present an azotized substance called ptyaline, upon which the peculiar digestive power of the saliva upon starchy food depends. So energetic is its action that, if starch paste, at a temperature of 100° F., is introduced into the mouth, it will yield traces of sugar in half a minute. The admixture of starch and saliva out of the body produces the same effect, and it is a true instance of catalysis. But it is in the small intestine that the digestion of starch and sugar especially takes place. Under the action of the intestinal juices, the same series of changes take place which we have seen under the catalytic action of sulph. acid and diastase. The starch is converted into dextrine, the dextrine into glucose, in which state it passes into the circulation. The active agents in inducing these changes are found by experiments, both in and out of the body, to be the pancreatin, a peculiar azotized principle of the pancreatic juice, and the peculiar secretion (not yet well analyzed) of the follicles of Brunner and Lieberkuhn: these substances yielding nothing of their own elements to the new substances formed, evidently act by virtue of their catalytic power.

"The process of stomach digestion gives us another remarkable evidence of catalytic transformation. Under the action of the gastric juice, all the albuminoid elements of the food, as albumen, fibrin, musculine, caseine, etc., are, without distinction, converted into a new substance called albuminose. This substance, while it has the general characters of those of the azotized class in being uncrystallizable and containing nitrogen, has peculiar characters of its own. Unlike albumen, it is not precipitated by nitric acid and heat; and has the property of freely permeating organic membranes, which albumen has not. The process of stomach digestion, then, is not a simple solution of albuminoid substances, but a transformation of them, effected by the gastric juice. This power of transformation does not reside in the acids of the gastric juice, which are found at the temperature of the human body to exercise only a feeble influence, although at the point of ebullition they possess it. The active agent in the process is found in the pepsine, a peculiar azotized substance

found in the stomach, which acts the part, even in minute quantities, of a most energetic ferment. So energetic is its action, that half a grain of acetate of pepsin dissolved in hydrochloric acid is capable of taking up 210 grains of white of egg; while the acid alone, at the same temperature, had an inappreciable effect. The azotized food being thus reduced to the condition of albuminose, the digestive process is perfected, and in this form it freely permeates the membranes and enters the circulation." * * * * —(*Chicago Med. Examiner.*)

"*Report on Chloroform.*—The report of the Committee of the Medico-Chirurgical Society on Chloroform has been produced this week, and an abstract of it was read at a special meeting of the Society held on Tuesday last. The labors of the committee have been very protracted; upwards of seventy meetings having been held, and a very large number of experiments performed. The report is of so great length that we shall find it difficult even to present it in abstract, since it will involve so considerable a demand on our space. We shall, however, endeavor in our next impression to print a satisfactory *abrégé* of the more important parts of the document. Meantime we may mention some of the leading facts.

"The committee have especially investigated the important question of the influence of chloroform on the heart and on respiration. Here are their most important conclusions on this point. They say that 'the first effect of chloroform vapor is to increase the force of the heart's action, but this effect is slight and transient, for when complete anæsthesia is produced the heart in all cases acts with less than its natural force. The strongest doses of chloroform vapor, when admitted freely into the lungs, destroy animal life by arresting the action of the heart; while by moderate doses the heart's action is much weakened for some time before death ensues; respiration generally, but not invariably, ceasing before the action of the heart, death being due both to the failure of the heart's action and to that of the respiratory function. The danger attending the use of chloroform increases with the degree of stupor it induces; the apparent irregularities in the action of the anæsthetic mainly depending on the varying strength of the vapor employed, on the quality of the chloroform, and on the constitution of the patient. In order that it may be administered with comparative safety it is necessary that the percentage of vapor should not exceed three and a half per cent., that its effects should be carefully watched, and the inhalation suspended when the required anæsthesia is induced. In many respects the action of ether is similar to that of dilute chloroform. At first its vapor increases the force of the heart's action, an effect which is both greater and of longer duration than that observed with chloroform. The stimulation is followed by a depression of the force of the heart's action, but, at the same degree of insensibility, ether does not depress the action of the heart to the same extent as chloroform; eventually ether kills partly by enfeebling the action of the heart, but chiefly by arresting the movements of respiration. Thus the energy with which chloroform acts and the extent to which it depresses the force of the heart's action, render it necessary to exercise great caution in its administration, and suggest the expediency of searching for other less objectionable anæsthetics. Ether is slow and uncertain in its action, though it is capable of producing the requisite insensibility, and is less dangerous in its operation than chloroform. On the whole, however, the committee concur in the general opinion which in this country has led to

the disuse of ether as an inconvenient anæsthetic. A mixture of ether and chloroform is as effective as pure chloroform, and a safer agent when deep and prolonged anæsthesia is to be induced; though slow in its action, it is sufficiently rapid in its operation to be convenient for general use. A mixture composed of ether three parts, chloroform two parts, alcohol one part (by measure) is to be preferred on account of the uniform blending of the ether and chloroform when combined with alcohol, and the equable escape of the constituents in vapor, and the committee suggest that it should be more extensively tried than it has hitherto been in this country.' As to resuscitation, they find that 'the most certain means of restoring life after poisoning with anæsthetics is by artificial respiration.* By this means resuscitation may generally be accomplished after natural respiration has ceased, provided the heart continue to act; and it may *sometimes* be effected even after the cessation of the heart's action, but this result is exceptional. Galvanism resuscitates within the same limits as artificial respiration; it is, however, far less to be relied on than artificial respiration in equal cases. With either remedy it is found that animals quickly rendered insensible by a strong dose are more easily recovered than those which have been gradually narcotized even by a small percentage of the anæsthetic.'

"In their rules for the administration of chloroform, they state that an apparatus is not essential to safety if due care be taken in giving the chloroform. Free admission of air with the anæsthetic is the one thing necessary, and, guaranteeing this, any apparatus may be used. Three and a half per cent. is the average amount, and four and a half the maximum proportion, of chloroform to atmospheric air which is either needful or safe. In case of accident in the more threatening conditions, artificial respiration is advised to be commenced instantly, and this equally in all cases, whether the respiration has failed alone, or the pulse and respiration together. Galvanism may be used concurrently; but artificial respiration is on no account to be delayed or suspended in order that galvanism may be applied.† The uses of chloroform in natural and abnormal labor are very carefully discussed. There are considerable appendices, giving lists of selected experiments, an analysis of accidents with chloroform, statistics of surgical operations, selected experiments on resuscitation, and an obstetrical report. The whole document is one which will be read with great interest, and gives evidence of industry and ability such as committees rarely lavish on their joint-stock productions."—(*Lancet*.)

"*Chloroform Deaths*.—There is one practical fact connected with chloroform deaths that is curious, and which I wish some of the Dublin surgeons would 'turn in their mind' and examine, while we in London are in a typhoon of theoretic speculation as to it. About 90 per cent. of the cases are in trivial small operations in persons in perfect health, viz., dentists' cases, operations of *convenience*, as my Dublin friend Adams used to term them. It was curiously shown at King's College this month there have been four deaths from chloroform in that hospital, and though my other friend Fergusson is wielding the knife *noctes atque dies*, as we

* It does not appear that the committee either tried nitrous oxide, or had any knowledge of its use in such cases for the removal of the asphyxiated condition.—Z.

† The most efficient means of restoring arterialization, circulation, respiration, innervation, and general life action in asphyxia, is by the administration of nitrous oxide, either by the lungs or alimentary canal, as before mentioned.—Z.

used to say in Virgil, and the *atra janua*, etc., and though one sees there every great operation almost in surgery, except tying the aorta, which I saw at St. Thomas's, as well as ovariectomies by the dozen in that or other institutions, Guy's, St. Bartholomew's, etc., yet the general experience of the hospitals is the same, viz., deaths always occur in *trivial* operations, exactly as the patient is getting under the chloroform before consciousness is entirely lost. I say getting under the chloroform to distinguish it from death after a severe operation and deep anæsthesia. This is quite unknown. There is no meaning in the superficial idea of the journals here that it is in the mode of the administration. Professor Miller saw the thing first, and his is the only book of all our manuals exactly right as to apnoea as the cause of death. His 'law of tolerance' is curiously exact. Nearly all cachectic hospital patients will tolerate chloroform; but it is in trivial operations in perfect health in adults, in men rather than children or women, all statistics show that danger occurs. Of the four cases at King's College, three were removal of trivial warts from the labia; the fourth was a trivial operation equally simple on the urethra, the chloroform given with just as much care in one set of cases as the other."—(CHARLES KIDD, M.D., *Dublin Med. Press.*)

Neuralgia of Stumps, etc.—"M. Verneuil, who has paid much attention to the question of irritable stump, attributes the production of the neuralgia to neuroma, which itself may be due to irritation of the extremities of the nerves by the cicatrix or bone, and he thinks the best preventive is to cut off the nerve at a sufficient height to prevent all injurious compression. M. Broca does not believe that the return of the pain in such cases depends upon a regeneration of the divided nerve, as motion is not reproduced, which, in the case of a mixed nerve, it ought to be. In his numerous experiments upon excision of the sciatic nerve in the sheep he has never been able to obtain reunion of the ends of the nerve. He is disposed to attribute the partial renewal of the pain in the present case to an affection of the femoral nerve. In reply to an objection by M. Marjolin, that excision of the nerves would impair the cicatricial power and induce gangrene, he states that his experiments have amply demonstrated to him that complete and satisfactory healing may go on when all nervous supply from these sources has been cut off. He observes that we should not confound mere reunion of the ends of the nerves with regeneration, which implies a reproduction and intercommunication of nerve lobules, a far more complex procedure. M. Houel referred to M. Nélaton's case of resection of a portion of the median nerve, with subsequent reproduction of both sensation and motion in eight or ten days. This case was received with so much doubt by M. Verneuil and others, that, at a subsequent meeting of the Society, M. Houel furnished full and interesting details. It is the same case which M. Laugier referred to in his paper on suture of the nerves, referred to in our notice last week. M. Legouest communicated the summary of an elaborate essay by M. Gherini, of Milan, and M. Richet related a case to show that excision of the nerve in this or any form of neuralgia is but a palliative procedure."—(*Med. Times and Gaz.*)

"On the Effects obtained by the Reunion of the Divided Ends of Nerves possessing different Functions.—In the January number of this journal for the present year, an account was given of the observations on

the effects of uniting the opposite ends of divided nerves possessing different functions by MM. Gluge and Thierresse. We now proceed to give the conclusions arrived at by MM. Philipeaux and Vulpian. Their experiments have been very numerous, and were chiefly made upon dogs, and they found that old animals bore the requisite operations better than young ones: 1. When the peripheric end of one nerve of mixed functions is joined to the central end of another mixed nerve, intimate union takes place between them. 2. A similar junction occurs when the central end of a sensitive nerve is placed in contact with the peripheric end of a motor nerve. 3. Under the influence of the anatomical and physiological conditions thus produced by the experiment, the peripheric end of the motor nerve, which in the first instance undergoes complete degeneration, becomes throughout its whole length completely regenerated; and 4. This takes place in old animals as well as in young ones, the only difference being that it is sometimes more rapid in the latter. 5. While *autogenic* reparation of the peripheric end of a cut nerve—that is to say, the reparation which takes place in the peripheric end of a nerve allowed to lie loose in the tissues of the part—is ordinarily very imperfect, at least for several months, the regeneration of the peripheric portion of a nerve, when placed in apposition with the centric end of another nerve, is much more perfect, complete regeneration of all the nerve-tubules appearing to take place. 6. It is also more rapid, even though it be a nerve of different functions. In young animals—for instance, in the former case—no attempt at regeneration can be observed after forty days, while in the latter it is very evident twenty-eight days after the operation; and in old animals the difference is still more marked. Hence it would appear that in the second case regeneration is hastened by an influence proceeding from the nervous centres. 7. The regenerating influence, probably emanating from the nervous centres, can therefore be transmitted to the peripheric end of one nerve by the centric end of another possessing different functions. 8. And it seems to be of no consequence whether this centrifugal influence passes through the centric end of a motor or of a sensory nerve. 9. When the union is perfect, and the regeneration of the peripheric end is sufficiently advanced, stimuli applied to one of the ends can be propagated through the junction to the other. 10. This effect can be most distinctly shown when the peripheric end is motor, for it is possible to excite contractions by the application of stimuli to the sensory nerve above the cicatrix in the muscles supplied by the peripheric extremity of the motor nerve. Strong contractions of the muscles of the tongue can thus be induced either upon mechanical or electrical excitation of the centric extremity of a pneumogastric or lingual nerve united to the peripheric extremity of a hypoglossal nerve. 11. By establishing a similar union between a cerebro-spinal and sympathetic nerve, movements can be excited in the parts supplied by the latter in consequence of irritation applied to the former. Thus galvanization of the peripheric end of the hypoglossal nerve, united by operation with the upper end of the cervical sympathetic nerve, produces, when cicatrization is complete, all the effects upon the eye and pupil which characterize stimulation of the sympathetic itself. 12. The changes induced in any point of a nerve by the application of a stimulus can be clearly shown by experiment to be propagated centripetally as well as centrifugally, whatever may be the function of the nerve. 13. It is impossible, therefore, to attribute either motor or sensory properties to the nerves themselves. The nerves are motor or sensory

not by virtue of any power inherent in themselves, but simply as the result of their centric and peripheral relations. They must be regarded as irritable or excitable cords capable of conducting irritation in one direction or the other, whatever may be their structure, and whether they belong to the nervous system of animal or of organic life.”—(*Brit. and For. Med.-Chir. Review and Dublin Med. Press.*)

Neuralgia relieved by Arsenic.—“DR. CAHEN, Physician to the Jewish Hospital founded in Paris by M. de Rothschild, has given arsenic with success to sixty-five people suffering from neuralgia:—

Facial neuralgia.....	35
Sciatic “	8
Intercostal “	4
Otic “	2
Dental “	2
Epigastric “	14
	—
	65

“In the two cases of dental neuralgia, the patients had had several teeth extracted in vain. One young lady among others had had eight teeth pulled out. M. Cahen gave her arsenic, and the cure was both successful and rapid.”—(*Braithwaite's Retrospect.*)

“*Bone, Teeth, Hair, etc. extracted from the Bladder.*—Rebecca B., aged thirty-eight, sent to me by Mr. Wright, of Chatteris, in July, 1852. A healthy person, with the usual symptoms of stone. The urine alkaline, containing pus and blood corpuscles, and crystals of triple phosphate. Said that ever since her last confinement, seven years ago, she had been subject to pains in the left side of the lower part of the body, which were sometimes very severe. During the last year she had observed frequent ‘settling in the water, of red color, with pieces of flesh.’ For the last few months only had experienced pain in passing urine. She said also that she had occasionally voided pieces of chalky substance, and once something much like a tooth. The sound came in contact with a foreign body, which was judged to be a stone. I accordingly proceeded to dilate the urethra in the manner above described. After twenty-four hours, a small pair of lithotomy forceps were introduced, and soon seized a foreign body, which broke; a portion coming away in the forceps proved to be a tooth, like a bicuspid, in a socket of bone. I subsequently seized a larger mass, and having discovered it to be free, broke it with the forceps, and extracted several fragments of bone, teeth, and hair. She recovered quickly, and in a fortnight returned home, stating that she was quite well, though there was still pus in the urine. The bone contained the usual corpuscles. The hairs, of a reddish-brown hue, were mixed up with the bone and included in it, as if the bone had been formed round them; possibly they may have become insinuated into the smaller orifices of the bone which they occupied. The teeth were like bicuspids and molars; the former with bent, the latter with imperfect fangs, and more or less completely inclosed in the bone. They were not arranged in a natural order, nor did the bone present at all the appearance of a maxilla. The fragments are preserved in the museum of the University of Cambridge.

“After several communications with Mr. Wright, I went to Chatteris, on March 23d, 1854, to extract further accumulations from the bladder.

I learned that soon after her return home she began to pass from the urethra pieces of bone, teeth, and masses like chalk. One of the latter, which was shown me, weighed a drachm and a half, and measured nearly two inches in its smallest circumference; it was of irregular shape, quite smooth, with a pinkish exterior. Cutting into it, we found it to consist of an outer friable earthy crust, inclosing a fragment of bone with teeth projecting from it. The woman had lately suffered a great deal of pain, and was much thinned. Mr. Wright had succeeded in dilating the urethra by means of the catgut bougies; so that I had little difficulty in introducing my finger into the bladder. Directed to the left side, it entered a sac communicating with the bladder by a circular opening just large enough to admit the finger, having a soft, defined edge. In this sac I could feel a large rough stone. With some difficulty I passed the forceps through the bladder into the sac and grasped the stone. It broke, and repeated introduction of the forceps was necessary to clear the fragments from the bladder. Then the finger found a quantity of the broken stone in the sac, which I contrived, with a great deal of trouble, to bring away by means of the scoop. At length I was satisfied that the sac and bladder were emptied, and washed them out thoroughly with water by means of a syringe. The lining of the sac appeared to be smooth and soft, but uneven, not unlike that of a bladder with rugæ. She recovered without an unfavorable symptom, soon regained the power of retaining her urine, and has remained quite free from any disorder of the bladder. On September 25th, 1855, she was delivered of a very fine child.

"There were a great quantity of hairs in this stone, especially in one portion, which had probably formed the centre; but no bone or teeth. Mr. Warner ('Philosophical Transactions,' vol. xlvii.) and Sir Benjamin Brodie each met with a very similar case; and the most probable explanation of them is afforded by the supposition that one of those ovarian cysts, which are known not unfrequently to have bone, teeth, and hair growing from their walls, had ulcerated and discharged its contents into the bladder; that phosphatic deposit from the urine upon some hair remaining in the cyst formed the stone last removed; and that the clearing of the cyst on that occasion led to the cure. This view is confirmed by the dissection of another case by Dr. Phillips, given in the ninth volume of the 'Medico-Chirurgical Transactions.' There was a tumor of the ovary, containing cream-like substance and a quantity of hair, also a tooth attached to its wall; and 'the bladder was distended with a substance similar to that contained in the ovarian tumor. Here, also, was discovered another large tuft of hair.' I presume these contents had passed from the ovarian tumor into the bladder through some ulcerated communication.

"The origin of the hairs, which have in a few cases been observed to pass from the urinary passages of the male, is somewhat more obscure. There are so many sources of error, that it is first necessary to substantiate the fact with great care. Dr. Henry ('Medico-Chirurgical Transactions,' vol. x.) satisfied himself, by the most careful investigation, that a quantity of short hairs, which a middle-aged gentleman observed in his urine, had their origin from some of the urinary passages. Sir Benjamin Brodie also attended a gentleman who labored under calculus of the bladder and disease of the kidneys, in whose urine he every now and then detected some very minute hairs, which he suspected to have been of renal origin. Two years ago I had occasion to remove from the perineum of a

man, aged forty, one stone weighing five drachms, quite smooth, and composed apparently of lithate of ammonia, investing a soft, putty-like nucleus; also several other smaller stones, made up of phosphate of lime and a quantity of short fine hairs, which were most numerous in the interior of the calculi. I could discover no hairs in the larger stone. The sac in which they were contained had an external fistulous opening, communicated with the urethra just in front of the prostate, and had a soft mucous lining. I examined the latter carefully, but could discover no hairs growing from it. During his convalescence, I repeatedly found short hairs in the urine which passed through the fistulous tract; whereas the urine taken from the bladder by a catheter, which I introduced several times for the purpose of this investigation, did not appear to contain any, or so few that they might have been accidentally missed. I concluded, therefore, that they had their origin in the fistulous tract. This man had been lithotomized by Mr. Okes, Sr., when he was four years old; and a second time, a year afterward, by Mr. Okes, Jr. In the first instance, a cystic oxide calculus weighing four drachms; in the second, a fusible calculus weighing two scruples, had been removed. He recovered quickly each time; but was 'loose-watered' after the last operation, rendering it necessary to wear an instrument for the purpose of retaining the urine. The fistula had originated in an injury to the urethra by a sprain, causing urinary abscess ten years previously; and he had several times passed calculi through it. In the case related by Mr. Paget, of Leicester, ('Medico-Chirurgical Transactions,' vol. xxxiii.,) where a ring of lithic acid, with a fine hair in its axis, was removed through the persistent urachus, it is probable, as he surmises, that the hair was one of the pubic hairs, which had found its way through the umbilical opening."—(DR. G. M. HUMPHRY, *Lancet*.)

"Exfoliation of the Intermaxillary Bones of an Adult.—John T., aged forty, a laborer, who had had a chancre twenty-three years previously, followed by constitutional symptoms, came under MR. BRYANT'S care, on the 13th of July, 1863, with necrosis of the incisive portion of the upper jaw, following upon inflammation of the bone of ten weeks' standing. With a pair of dressing forceps the dead bone was readily removed, and found to be admirable specimens of the intermaxillary bones. These are preserved in the Guy's museum.

"In the year 1858 Mr. Bryant exhibited before the Pathological Society a like specimen, which he had removed from a child three years of age, an account of which may be seen in the volume for that year."—(*Lancet*.)

"Cyst in the Antrum.—Mary B., a healthy married woman, came under MR. BRYANT'S care, on the 2d of August, 1863, with a cyst projecting into the right nostril, causing its partial occlusion, and a projection beneath the right ala, the size of a walnut. It had been growing for fourteen years, but had made its appearance beneath the nose for only a few months. It was not attended with much pain, and she sought advice more from the disfigurement than for the distress occasioned by the new growth.

"There being no doubt about its nature, the cyst was tapped, and about two ounces of a blood-stained, limpid, albuminous fluid drawn off, the cyst at once collapsing, and the features recovering their true shape.

In a few weeks, however, the fluid had re-collected, the tumor being as large as ever. It was again tapped in the mouth, and a long strip of lint introduced, to excite suppuration. In four days this was removed, as the end had been obtained, and the case went on apparently well; but a fresh collection of fluid, of a purulent character, made its appearance, more particularly toward the nostril. This was accordingly again evacuated by a bistoury into the nose, and rapid convalescence followed.

"This patient was seen on the 2d of October, and was quite well."—(*Ibid.*)

"*Salivary Calculus.*—DR. PAPIN presented to the Society an interesting specimen of salivary calculus, which he had removed from the right side of the soft palate of a patient lately under his care. The patient, a lady of sixty-five years of age, had suffered from slight, but very annoying sore throat, for two years. She had consulted physicians here, but being informed that it was nothing serious, and the treatment giving no relief, she went to New York and Philadelphia, and the surgeons whom she consulted there assured her that she was only laboring under a slight sore throat—she would soon get well. She returned home and consulted two physicians before I saw her. When sent for, I found the patient very nervous, and somewhat debilitated. On examining the throat, I found the soft palate on the right side slightly red and tumid, and in the central position I noticed an ulcer with dark centre; on touching the dark spot, I felt something hard, like bone, and substituting the dressing forceps, I extracted a salivary stone, which I now show you. These seem to be very rare. I have only heard of two being met with in St. Louis—one by Dr. Pope and one by Dr. Phillips."—(*Cinn. Lancet and Observer.*)

"*Conservative Surgery.*—"In operations on the lower jaw, conservatism may be, and is, displayed in a manner to which few give much heed. But I beg your particular attention to this fact, that tumors of great size have been removed from this bone. The whole of one side thus implicated has been cut away by incisions across the bone, and the portion left has remained healthy throughout life. I have myself taken away by a horizontal incision as much of the alveolar margin of this bone as contained ten teeth, yet there was no return of the tumor for which the operation had been performed. In the last of these proceedings there was conservatism in not interfering with the base of the bone, and thereby preserving the face or chin from considerable deformity. In the first there was the like display in not taking away more than was necessary. How few have reckoned on the value of cases like these, as showing that in tumors of osseous tissue it is not necessary to remove the whole bone! Yet such a doctrine of destruction has got strangely, and, in my opinion, alarmingly prevalent."—(PROF. FERGUSSON, *Lancet.*)

"*Solubility of Gold.*—While examining an alloy of silver and gold for the purpose of ascertaining the percentage of gold that it contained, I found, to my surprise, that a mixture of sulphuric acid and nitric acid dissolves gold to a considerable extent. This fact seemed to be of some importance, and being unaware of a similar observation having been hitherto made, I send you a note of it."—(A. REYNOLDS, *Chem. News.*)

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, OCTOBER, 1864.

No. 3.

ORIGINAL COMMUNICATIONS.

—
PRACTICAL HINTS.

BY J. D. WHITE.

SINCE the fifth of September there has been a great many cases of tooth-ache coming in. The northeastern storm that set in on the third seems to have been the cause of it; many cases also of sickness, of different kinds, have occurred, terminating fatally, which at other times might have yielded to treatment. Such is the experience of some of our medical friends, as we learn from conversation with them, and some cases have come within the reach of our own observation.

Now, we do not set it down as a bad theory, that a dentist should study and observe the state of the weather, while he is treating the teeth of his patients.

Case 1.—A lady, Mrs. Dr. B., aged forty, nervous temperament, came in from the country, twenty-five miles, on the sixth of September; two nerves were found to be exposed. We attempted to examine the case with our accustomed care, but the patient winced and yielded at every touch of the instrument, no matter whether it was in the cavity of the tooth or not; we told the patient that it was necessary to hold still in order that a proper diagnosis could be made. At this point, the patient commenced weeping; we then remarked to the husband, who was sitting by, that his wife was not in a condition to go to a dentist, and we would not attempt to do anything more to her teeth at present. He remarked that it was only a little nervousness consequent upon thinking about it, and he guessed we could go on. We sent the patient home for a week to see if things would be better; in the given time the patient returned cool and collected, but she had gone through with a severe attack of neuralgia, which at the first visit was just coming on, owing to the change of the weather. She remarked to us that she did not know what could have been the matter with her at the time of her first visit; her husband, the doctor, said he

never saw her so before, but accounted for it by supposing it was the extreme sensibility of the nervous system at the time; he expressed himself very happy that we did not persist in operating at the first sitting.

Case 2.—Mrs. N., seventh September, aged thirty-five, nervous temperament, and gouty, suffering from extreme pain on the right side of the face, especially in the wisdom tooth of the upper jaw, the wisdom tooth, first molar and both bicuspidis of the lower jaw; the teeth were all sound, but the gums were inflamed, and slight ulcerations going on all along the margins, marked by an extremely red line. We removed the tartar, as there was a slight deposit of it, and a white sediment like milk curd; the gums bled freely; we touched the parts with deliquesced chloride of zinc, and instructed the patient to call in two days. There had not been so much pain, but the gums were still inflamed and ulcerating, and the margins, especially the points of the festoons between the teeth, sloughing away; the teeth were somewhat loose in their sockets; the parts presented the appearance of a slightly scorbutic character. At this point, we ordered the following to be taken internally:—

R.—Chlorate of potash, ʒii ;
Aqua, ʒvi .

A tablespoonful three times a day, after meals, and the mouth to be rinsed with it four or five times per day; the patient to call in three days. At the end of this time there was no appearance of the ulceration of the gums or inflammation. This patient informed us that she lived entirely on vegetable food, and this was perhaps the cause of a tendency to scurvy. It is also true that females who confine themselves very much to the house get a dislike to a meat diet.

(To be continued.)

ON SULPHURIC ETHER, ITS RELATIVE VALUE WITH OTHER ANAESTHETICS.

BY GEO. T. BARKER, D.D.S.

Read before the American Dental Convention, Aug. 1864.

THOUGH many agents may justly be denominated anæsthetics, a word which simply means “an agent or agents that prevent feeling,” yet it is not my object in this communication to direct attention to more than the three principal agents usually known as anæsthetics, viz.: nitrous oxide, chloroform, and sulphuric ether.

The first named has long been used as an exhilarant in public and private exhibitions, and was referred to as long ago as the year 1800, by Sir Humphrey Davy, who described at length, in his researches, its peculiar effects, and predicted that it would eventually be used for the purpose of preventing pain in severe surgical operations. This prediction has been verified, and to Horace Wells, a dentist, belongs the credit of

first demonstrating this truth, by actual experiment; and though, in a measure, he was unsuccessful in subsequent experiments, he yet deserves to be remembered with everlasting gratitude, by the whole civilized world, as one who has robbed the surgeon's knife of half its terror, and this day, perhaps, some wounded veteran beholds for the last time his mutilated members, but with unlimited confidence "wraps the drapery of his couch about him, and lays him down to pleasant dreams."

The extended use of nitrous oxide as an anæsthetic is of recent date, and persons wholly unacquainted with the effects of the gas, physiologically or pathologically, have rushed into its use, ignorantly proclaiming its harmlessness, because, forsooth, its composition, chemically, was oxygen and nitrogen, the elements of common air, stating that "it only made persons live faster." For a refutation of this fallacy, I would refer to the articles of Professors A. Westcott and T. L. Buckingham, who have so lucidly stated the difference between a mixture and a chemical combination, clearly and logically proving that, were this the case, nitric acid, which contains five equivalents of oxygen with one of nitrogen, would be more innoxious than the nitrous oxide, which contains only two of oxygen with the same of nitrogen.

It has also been stated that nitrous oxide "can be given in all sorts and stages of disease." The very fact of so unqualified a declaration ought to be sufficient to throw discredit upon the assertions of its partisans. It is like the testimony of some witnesses, disbelieved because they prove too much. Who in their calm senses can assert that any one agent, no matter how harmless and of common daily use, can be given in all sorts and stages of disease? It cannot be done, and it has already been proven, by the fatal results attending the use of this gas, that at least, in *tubercular phthisis*, it is exceedingly dangerous to administer it.

Another objection which may be urged to the use of this gas, is that in its administration it is necessary to cut off all atmospheric air. It is an undoubted fact, and is attested by testimony most worthy of belief, that a frequent cause of fatal results with anæsthetic agents is due to an absence of atmospheric air, and I see no cause why there should be any exception to the rule with nitrous oxide.

Another phenomenon, which has been looked upon with alarm by me when I have administered the gas, and one which all must recognize who give it, is the increased quantity of blood which seems to be directed to the head during the period of inhalation. The face will become greatly suffused, perspiration often pouring forth, and this in many cases continues during the whole operation. In some cases the patient will describe the first sensation as that of great fullness in the head, particularly in the brain. This very symptom would indicate its danger where there was any predisposition to inflammation of the brain or apoplexy.

It is asserted by the advocates of nitrous oxide, that the whole time

occupied in the inhalation and extraction of from three to ten teeth, with the return of the patient to consciousness, does not exceed three minutes. This I believe to be a fact, and the very rapidity with which anæsthesia is induced, I consider is a serious objection to its use. It is a law recognized by the best writers on the action of medicines, that the more rapidly any stimulant effect is induced, the greater will be the subsequent depression. Professor Geo. B. Wood, one of the authors of the United States Dispensatory, in his work on Pharmacology and Therapeutics, thus remarks on this subject: "One of the laws of all stimulation, whatever may be its degree, is that it is followed by a depression proportionate; at least approximately to the previous exaltation of the function or functions excited." Other objections to the use of the gas may be stated as the difficulty attending its manufacture pure, as well as keeping it on hand, and the necessity of the patients exhaling into the bag from which they are inhaling, the gas becoming impure from the admixture of carbonic acid gas. These, however, may be overcome; but we hope to be able to prove that it is not so safe, not more sure, and possesses *not* one single advantage over sulphuric ether.

In a paper of this character, notice of each article must be brief, and therefore pass to the consideration of chloroform.

This article was discovered in 1831, by Samuel Guthrie, of Sackett's Harbor, New York; but it was not until 1834 that Dumas ascertained its chemical constituents. Chloroform locally acts as an irritant, and is afterward followed by a sedative influence when applied to a sensitive part, as mucous membrane, or on an abraded part, it excites a painful burning sensation, with considerable rubefaction. On the sound skin it does not produce so irritating an effect, though it does in some instances induce severe vesication, particularly where the undiluted article is used for the purpose of inducing anæsthesia. Chloroform is made use of by the surgeon to produce a local influence, the agent being applied to the extremities of the nerves, and it has been noticed that the insensibility is confined not only to the extremities of the nerves, but extends a considerable distance along the nervous trunk. In its general influence, "chloroform is powerfully sedative, primarily to the nervous system, secondarily to respiration and circulation."

It is absorbed by the blood, which is proven by the breath of a person after it has been inhaled. It has also been detected in the blood and in the tissues after death. When chloroform is inhaled, it produces three stages more or less marked: 1st. A stage in which the vision becomes clouded, slight confusion of the brain, the sense of hearing considerably increased. 2d. An anæsthetic condition, insensibility to painful impressions, though this may supervene, and frequently does before consciousness and muscular power are lost. 3d. Coma and complete muscular relaxation. If pushed beyond this stage, respiration becomes slower,

the pulse feeble, a livid appearance is presented on the surface and in the face, and, finally, respiration ceases, followed by an immediate cessation of the heart's action; death being the result.

Fatal results may be induced by chloroform in two ways: either by paralyzing the respiratory nerve centres, thus suppressing the function of the lungs, and, secondarily, the heart. It may also occur where an exceedingly small quantity is given, by first paralyzing the heart, producing local anæsthesia of that organ. Mr. Paget and Dr. Snow have both called attention to fatal cases, where respiration continued some time after a cessation of the heart's action. It may be explained in this way, chloroform is carried into the lungs, where it is absorbed by the blood, and by means of the pulmonary veins is carried to the heart. From the heart it passes into the aorta, the first branch of which is the coronary artery, which supplies the heart itself with blood. The blood which is surcharged with chloroform makes its impression, therefore, first upon the heart, producing local anæsthesia, arresting its muscular action, death following as a sequence.

In the first method, death is caused by asphyxia; in the second, by syncope. Dr. Snow, whose experience with chloroform was very extensive, has stated in his book on anæsthesia, that if the atmosphere is loaded with as much as eight or ten per cent. of chloroform, it is apt to act directly on the heart, and thus becomes exceedingly dangerous; while if it contain only four to six per cent., it may be inhaled with impunity.

It is generally supposed that where deaths occur from the use of chloroform, it is where there is some disease of the lungs or heart; this, however, is not the case, as the accident has happened more frequently where there was no disease or general debility, but where the person was in excellent health. Where chloroform is used by the dentist, it is rarely necessary to push the anæsthesia further than the second stage, and then it requires the greatest care and discrimination. It is not much used, that is, in comparison with ether, by surgeons in this country; and every one must admit that its exhibition is attended with danger. In a table, published in the *New York Journal of Medicine*, out of thirty-three cases, three are stated to have died instantly; two, in a minute; ten, in from two to ten minutes; one, in a quarter of an hour; one, in half an hour; one, in three hours; and the remainder in periods varying but slightly from those above mentioned. One great care in its administration, should be to dilute the vapor with plenty of atmospheric air. Chloroform, though producing anæsthesia more quickly, except in rare cases, possesses no advantages over the next agent to which we would direct attention.

Sulphuric ether, like nitrous oxide, was long known and used as an exhilarant, before any of its anæsthetic properties were known, and as long ago as the year 1830, a law was passed by the municipal authorities of

this city, to prevent druggists from selling ether to boys, as they were in the habit of pouring the ether into a hog's bladder, and then inhaling it, when an exhilarant effect was produced; and one or two were seriously injured by running before vehicles while in this state. Its first public use as an anæsthetic was by Dr. Morton, of Boston, and since that date (1846) it has been steadily growing in the favor of physicians and dentists, in this and other countries. Many have complained that with sulphuric ether, they could not induce perfect anæsthesia, and that with patients there would be more or less excitement, accompanied with violent muscular efforts. As the object of this paper is to overcome such objections, I will premise, by remarking that, having administered ether to over 6000 persons, I can confidently assert that I have never met with more than two or three persons whom I could not perfectly, and, without difficulty, control, without any aid from a second party; and both of those cases were men who were habitual drunkards. The reason why I have been thus successful, is attributed to the following causes: *First*, the administration of pure ether; *second*, the observance of certain rules as to its inhalation. Much of the ether which is sold in the shops is very impure, and will be liable, if administered, to cause headaches, if not more serious systemic disturbances; much of the impurity may be removed by repeated washings, but even then it is difficult to induce anæsthesia with it. The best ethers manufactured in the United States are those made by Squibs, of New York, and Powers & Weightman, of this city. The last-named firm make an article, known as concentrated ether, which is most excellent; and there is not one person in a hundred that cannot be thrown into an anæsthetic state by it. In the administration of ether, it is of great importance to instruct the patient how to inhale it. This should be accomplished by strong full inhalations, followed by strong full exhalations; the latter are invariably insisted upon, as it is necessary to expel as much as possible of the residuum of atmospheric air present in the lungs, thus allowing the air and ether vapor to pass into the air-cells, there to be absorbed by the blood, which carries it to the remote tissues, there to arrest and suspend, during the anæsthetic state, the physiological process of combustion. The sponge or napkin, on which the ether is poured, should also be removed at each exhalation, so that it will not be affected by carbonic acid gas. The stages of anæsthesia with ether resemble those induced by chloroform; but with ether there is not the danger of making an impression on the heart, as with chloroform, as it has not the power to produce local paralysis. It may be asked, is ether safe to administer in all cases? In all sorts and stages of disease, I do not believe it is, but in ordinary health, my judgment is that any one can take pure ether without the slightest danger; while in many cases, as for instance in consumption, patients have inhaled ether, and it has been followed by great relief, the

patient expectorating more easily than before its administration; these may, however, be considered exceptional cases. Dr. Snow, whose work has been referred to in this paper, and whose experience with anæsthetics excelled that of any person in Europe or this country, thus speaks of the great safety of ether:—

“I believe that ether is incapable of causing the sudden death by paralysis of the heart, which has caused the accidents which have happened during the administration of chloroform. I have not been able to kill an animal in that manner, even when I have made it boil and administered the vapor almost pure. I hold it, therefore, to be almost impossible, that a death from this agent can occur in the hands of a medical man, who is applying it with ordinary intelligence and attention.”

Dr. Wood remarks, “while scarcely one well authenticated death from ether, used as an anæsthetic agent in surgery, can be adduced, and very few even of remoter evil consequences, the recorded list of fatal results ascribed to chloroform has swelled to nearly or quite a hundred.” The inhalation of ether is usually followed by more or less prostration, as it belongs to the great class of stimulants; but this can be greatly lessened, by invariably insisting that the patient shall take a long walk after its inhalation.

While I believe the inhalation of ether is not attended with danger in ordinary health, yet consider it contraindicated in cases of seriously diseased heart, in active congestion, or acute inflammation of the stomach, brain, or lungs, or where there is a tendency to the hemorrhagic diathesis, or a generally plethoric condition. In some of these diseases, any shock, as the extraction of a tooth, is attended with danger, either with or without any anæsthetic; but with ether, as with every agent that possesses anæsthetic properties, it is imperatively necessary that the operator should have confidence in the agent, and intimate acquaintance with its various properties, with judgment sufficient to discriminate when and to whom it should be administered.

PHILADELPHIA, July 20, 1864.

ANAESTHESIA.

BY WM. H. ATKINSON, M.D.

Read before the American Dental Convention, August, 1864.

ABSENCE of feeling is death in the degree of its presence.

Magnetic depolarization is doubtless the most complete safe anæsthetic yet discovered.

All anæsthetics act in principle substantially in the same manner by arresting passional action. And yet why such apparently diverse agents should produce identity of result is, like all speculations respecting combination and affinity, as yet beyond any satisfactory solution.

Why stimulation and sedation should deprive the brain of the ability to transmit to the consciousness the impressions made upon the organs, can only be clearly apprehended by a comprehension of the philosophy of polar tension resultant upon the positive-vascular or arteriose, and the negative or nerve blood, whose circulation is nothing less than a continuous change of their respective poles. Any disturbance here has a direct effect upon the æsthetic function.

Just how anæsthetics act upon the galvanoid currents resultant upon change of polar tension in the neural and vascular circulations, is not yet demonstrated; but that they all have the power of striking down the one or the other by which the sentient effect is produced, is beyond cavil. It is probably by demagnetizing the molecules of the neurine, or those of the arteriose blood, or it may be both these bodies are deprived of their magnetism during the sentient lapse.

The degree and time of continuance of the depolarity will define the limit between anæsthesia and death, or absolute depolarization of the whole apparatus by which the wonders of the phenomena of individualized being are produced and maintained.

The difference between food and poison, is but difference of relation of affinity by which election or rejection, appropriation or expulsion of foreign bodies takes place when brought within the sphere of attraction of the ultimate cells or sea of mucus mass in which food and infection display their mysterious power. Foods becoming poisons, and poisons foods, in accordance with the condition of the system at the time of the introduction of these agents.

As is well known, many of the most virulent and destructive poisons, when taken in the concentrated state, are our best prophylactics and remedies against debilities, when in the requisite degree of attenuation to develop the affinity necessary to awake the waning polarity in the ganglionic or blood centres necessary to the continuance of the phenomena of life.

Gray nerve mass is said to secrete, and neurine, or the white substance of Schwan, to transmit that which we call "nerve force."

But how we are able to act upon a force by entities, whose character is known only by the effects which they produce on the living organism, is not satisfactorily determined without experiment.

This, fortunately, of late has been extensively resorted to with marked advantage, and addition to our knowledge of æsthesia, anæsthesia, and hyperæsthesia, displaying the superior tenacity of life in the cell to organ, and this to the system.

The life of resilience in the cells resuscitating the organ deprived of its life and power to move, which, when restored to activity, in turn sets up the systemic actions which re-establish the æsthetic function, completing the return to the normal state of the whole being.

Irritation, however produced, of the vascular nerves of sensory centres, is true anæsthesia. And when we shall have so far explored the affinities of drugs and tissues as to have discovered and isolated such as respectively act upon motor, sensory, and nutrient nerves, we may safely administer these otherwise dangerous agents.

And, indeed, then they will not only be palliative, but curative remedies; so that the discovery of the true philosophy of anæsthesia, like all complete fulfillment of mission everywhere, will have precluded the necessity of using anæsthetics.

Anæsthesia, æsthesia, and hyperæsthesia are but the oscillation of *feeling* dependent upon organization and nutrition, normal and abnormal; or, in other words, simple augmentation and suppression, or privation of passional activity *without perversion*, and hence differ in degree only in the intensity of the actions which produce them. The attempt to comprehend the philosophy, including the danger and safety of anæsthesia, will be next to fruitless, until the whole round of phenomena ("Tolle causam") pertaining to feeling be so reduced to legitimate apprehension as to render it capable of textual or aphoristic pronouncement.

Completely to finish this work, would be to conquer the most gigantic obstacles in the way of understanding the how and the why of individual being.

So intimately connected with the function of breathing is all anæsthetic effect, that it may, and doubtless will, facilitate our purpose to penetrate as far as we may this ethereal, almost spiritual process.

All cell action is but a modified breathing, and hence the more aerial, or rather ethereal the products of digestion become, the more vivid is this action in passing and repassing the portals of cells and membranes of these occult somethings which collect, penetrate, and act upon the contents of cells, and then depart or drive out such occupants as had become unwelcome there, because unable to take part in the proper polarization of these seemingly insignificant bodies, without whose plus and minus act regularly taking place, they must lose their character as healthy constituents of organs.

General breathing is this same process taking place throughout the external skin and the mucous membrane of the lungs and open cavities of the body, constituting, with the deep-seated cellular diastole, digestion, and systole, the function of breathing in the most extended sense; any interference with any part of which will interrupt the essential oxidation and deoxidation, or carbonization of the tissues; the exact equipoise of all of which constitutes harmony of function of the whole cellular, organic, systemic, and sentient or passional activities.

Thus the sentiency may retire from any or all its outposts without permanent injury, but if it once be forced to quit its most interior court in the medulla, we as yet have no means of preventing the divorce from being final.

The respiratory function of the cells of the body, but especially the red corpuscles of the blood, prove that equilibrium in their totality of function can alone give us the measure of physiological combined action upon which æsthesia depends. We would, then, naturally look into the respiration of these bodies for the true causes or actions which govern anæsthësia, æsthesia, and hyperæsthesia.

And as the microscopical examination of the blood column reveals no change in this complex life agency, except a melanic or shrunken condition of the red corpuscles, which deprives them of their power as carriers of oxygen, it is fair to attribute the loss of feeling to this cause, inasmuch as the circuit of polar tension must be intact to produce and continue the æsthetic function, and that part of the galvanic tract or circuit in the blood seems to depend entirely upon peripheral plumpness of the red corpuscles, electroid actions always being peripheral.

The breathing of cells is interrupted by many agencies, but the one least dangerous and most complete in expression of stoppage and recurrence of this action, (after a properly applied and conducted magnetism,) is that of thickening of the free sea of fluid by the application of cold, and the return of the requisite degree of warmth to favor mobility of the fluids, external and internal to the cells.

At a temperature a little below the freezing point, the fluids become stiffened, and in a perfect state of anæsthesia; so also does a certain temperature above that of the human body effectually establish perfect anæsthesia; but this last is hard to remedy, and requires time to restore the requisite molecular condition to re-establish the normal cell actions, and if the temperature be high enough, permanent death and after sloughing of the part will occur.

So gradually does the molecular activity necessary to sensation retire upon the application of cold, that it is doubtful whether complete solidification of the entire system might not be so gradually attained as to arrest all molecular action incompatible with perfect congelation to the most interior, so gently as to permit resuscitation of an individual thus perfectly anæsthetized, if the exact stages and degrees of frigorific activity were precisely reversed, beginning to thaw first at the point last frozen.

There are two conditions, short of disorganization of cells, in which they become perfectly powerless to transmit the impressions made on them to the sensorium. The first is a surcharge of their normal contents, and the second is a considerable privation of the same: first, apoplexy; second, syncope; continuance of either of which eventuates in death of the cells so circumstanced.

The persistency of this state is influenced by the constitutional character of the cells and tissues, and by the character of the special stimulus or sedative producing the state. These are examples of *intoxication* and *ex-*

toxication, when they occur in an unmixed or single pure example of the act.

The result is general or local, in accordance with the mode of application. Idiosyncrasy of the patient is also a great modifier of character, direction, duration, and degree of the sentient lapse. In some constitutions the mind is in normal action while the general motor and sensory systems are quite under control. In these cases the patient is conscious of all within the range of vision or sound, but utterly helpless, which much detracts from the advantage of the mental consciousness.

Another class are easily overcome by the utter swamping of the senses, while the irritability of the parts operated upon is rather increased than diminished, inducing local spasms upon the touch of the instruments in making operations.

As yet we are without the specific knowledge requisite to render anaesthesia perfectly safe.

DENTAL FEES.

BY J. S. LATIMER, D.D.S.

STRICTLY, and according to the law of equivalents, equal services should be equally remunerated, no matter by whom rendered; but there are modifying laws which materially affect our proposition, and one of these is that of demand and supply. Professional service, then, is subject to the same laws that govern the price of any ordinary merchantable article. Hence it is that a new brand of flour, no matter what its excellence, is at first offered at a low figure, and the price gradually advanced as the demand for it increases; and hence, too, the late importation of dental skill is generally and wisely offered to the community, at first apparently for less than its intrinsic value.

I say *apparently*, because the *money* compensation is not all the consideration received, for the prospective advantage hoped to be derived from the distribution of specimens of skill may constitute the larger part of the remuneration.

If a dentist takes his skill to a new market and is so fortunate as not to be under the necessity of depending on present earnings for subsistence, he may hold his efforts at as high a figure as he pleases and wait the good pleasure of the public with composed dignity. But, by far the greater part of our profession have to depend on their daily earnings, and for such to attempt the species of speculation in which their more fortunate neighbors succeed is unwise in the extreme. I speak from experience, having commenced at the foot of the ladder myself.

While the foregoing is true, it is equally true that it is mutually the interest of dentist and patient to have the pay liberal; for the operator who undertakes an operation for less than he deems suitable compensa-

tion has permitted himself to be led into temptation; and woe to the patient if the dentist be not unusually honest, for the work will not be faithfully executed. The woe, too, recoils upon the dentist, nor leaves him in this nor the life to come. No man is stimulated to his best efforts by small compensation. I do not say that he may not have other and nobler stimuli, but I *do* say that small pay is not one of those stimuli. It is a safe rule never to employ a man in whose integrity you have not the fullest confidence; but, if you should ever be so unfortunately situated as to be compelled to contravene this rule, your safety lies in liberal payment, for an unscrupulous person is often encouraged to do well for pay when he would not do so from principle. Men *should* be virtuous for virtue's sake; but all laws, both human and divine, recognize the necessity for more than one incitement: hence the system of rewards and punishments. Constituted as man is, he should surround himself by every good influence, and encourage every motive to noble action. He should remember that God's eye is ever on him, and that he never subserves his real interest better than when he pleases and glorifies his Maker. No man is wise, no matter how strong he may deem himself, who fails to surround himself with every inducement to uprightness, or who permits any temptation to dishonesty to remain which he might remove.

Other commercial laws apply to dental fees, and one of these is, that the value of service is not affected by the ability of its recipient to render compensation. I know that in this I differ from some reputable practitioners. It is the practice of some of these to have a high tariff for well-to-do patients, but to discriminate in favor of those they presume are unable to pay their prices.

Undoubtedly the motive for this rule comes of benevolence, in a large majority of instances, but there are objections to it. Persons receiving such favor rarely attribute it to the right motives, nor are they likely to greatly appreciate that which costs them little. In this direction, I have had considerable experience, and could detail many cases to prove my position, but a single one must suffice.

During the winter of 1859-60, and soon after the perusal of an eminently practical paper from the pen of Dr. B. Wood on the subject of gratuitous work, a stranger brought his sister-in-law to my office, and said, in substance: "Sir, whether you do the needed work or not will depend upon your rates; if you go to charging any of your exorbitant prices I shall take her elsewhere." He averred that he was abundantly able to pay *any* price, but had no idea of being swindled. A suspicion of the facts in the case flashed across my mind, and I inquired the name and residence of my would-be patron. I found that he resided in the neighborhood with and was a relative of two other families for whom I had operated for about half my tariff rates because of their plea of poverty.

It was evident that at least one of those families gave me no credit for

benevolence in my gift to them, but presumed I was getting then something within the bounds of honest compensation, and that my tariff was excessive and dishonest. This gentleman, unwilling to stoop to the plea offered by his neighbors, undertook this method of opening my eyes to the fact that his eyes were opened.

I saw that Dr. Wood was right, and resolved to abandon gratuities, as a rule. By way of conclusion to this case, I may state that the gentleman was informed that I would operate for the lady on the same terms, precisely I would offer the Queen of England, and that I did not wish to do anything for her until he had seen references and learned to rely upon my integrity. I did the work, but shall be compelled to wait some time for my pay, unless I accept of rebel bullets, for that, in common with many other accounts, has been confiscated to the bogus Confederacy. Parenthetically, it may be remarked, that I subsequently learned that both the recipients of my benevolence, connected with the foregoing, were owners of considerable property, and much better able to give to me than I to give to them.

But, generally, there is another party who questions our motives in such cases. The man who, by self-denying economy, has placed himself in easy circumstances, does not wish to pay a larger fee than a careless, thriftless neighbor may pay a smaller one; he prefers to have the dispensing of his own alms. Again, he does not wish to pay a premium for shabbiness.

Others, again, go on the principle that "half a loaf is better than no loaf," and get what they can. They have no other standard than the ability of the patient to pay. Judging the internal wallet by the external man, (or woman,) they charge by guess. The argument urged by some is, that the patient having an income of \$10,000 a year and paying ten dollars per plug, does so with less inconvenience to himself than another with one-tenth the income suffers in paying one dollar for a like operation; hence, they say, what is worth one dollar to the second is worth ten times as much to the first, and hence it is right to conform the price to the ability to pay. But these gentlemen generally repudiate their own doctrine when they pay their grocer's bills. This fact refutes their logic. No rule is just that is not broad enough to cover both the contracting parties.

I have learned that some operators are in the habit of saying to the poor patient who asks a deduction in his favor, "Yes, I can give you work at half price, but it will be half-price work."

This plan is unfortunate for the dentist, his patient, and the profession generally. Suppose inferior fillings have been introduced for a patient with such an understanding; he goes away believing his teeth saved and his mind is at rest with regard to them. Two or three years pass, and those

plugs come under the eye of another operator, who examines them and pronounces them third rate, and imperfectly protecting the teeth.

Then comes the name of the unfortunate and *not* benevolent dentist. The pride of the patient prevents his telling the whole truth about the matter: hence somebody's reputation suffers; hence the patient suffers; hence dentistry suffers. A far better way is to do the work as well as possible, let the patient pay down as much as he can spare, and the balance in installments. Indeed, this is about the only application of the credit system I can recommend to the dentist. "Terms cash," conspicuously displayed, and well adhered to, will conduce to the reputation and pecuniary advantage of its adopter. Here is the reason: men and women are not all honest, consequently they do not all wish to pay their debts—this is unfortunate, but true. It is a law of human nature that men and women do not feel friendly toward those they have injured; hence the patient who owes for service for which he does not intend to pay, endeavors to excuse his omission to his conscience and his neighbors by pronouncing the service worthless. From this has arisen the saying among dentists, that work for which payment is due, rarely gives satisfaction. This is especially true in plate-work. In my own practice I have adopted the rule of requiring payment for plates before they are taken from the office.

Lastly, the prices, both in the operative and mechanical departments, should depend upon the amount of labor, patience, and material expended. Some of our best operators charge a fixed price per grain for large plugs of gold; but this is hardly a correct guide, for the disposition of the patient, the accessibility and shape of the cavity and the difficulty of keeping it dry, greatly modify the time, labor, and anxiety of mind.

Who has not felt, when excavating a sensitive tooth for a nervous and demonstrative patient, that he ought to be paid for the expenditure of sympathy and patience he has been compelled to make? In this conviction lies the beginning of the path which leads to the true estimate of any given operation.

I have frequently known a fractious patient to be quieted by the assurance that the charge would be in accordance with the time consumed, and I have come to believe such intelligence one of the best obtunders of sensitive dentine.

Whoever commits himself to the price, beforehand, does so unwisely, for he cannot possibly judge correctly while so many modifying causes are between him and the completion of the work.

Suppose the patient is told the probable price before the performance of the operation; if, after its completion, the dentist deems the figures too high, he will modify them, if honest; but if, as is oftener the case, the price has been made too small, he will not feel satisfied and yet may be deterred by delicacy from saying so.

But I fear this paper may be encroaching too much upon valuable space, and will bring it to a close.

127 Ninth St., NEW YORK, Sept. 1864.

[We do not think the above paper too long, and a good deal more plain talk on the same subject would not hurt the profession or the public.—J. D. W.]

THE TREATMENT OF PULP CAVITIES AND ROOT CANALS BEFORE FILLING.

BY HENRY S. CHASE, M.D.

Read before the Iowa State Dental Society, Aug. 1864.

EVERY one of experience knows how difficult it is to extirpate the vessels and nerves of the root canals after destroying the pulp. In many cases, of course, it is quite easily done; much easier in some classes of teeth than others; and more so in some *mouths* than others, even in the same classes of teeth, and where the position of the cavity is the same. When we can be sure that we have removed the contents of the root canals, I would advise the cavity to be immediately plugged, leaving at the distant extremity of each root a few fibres of lint moistened with creosote. When we are *not* sure that we have removed the whole, and in the molars, I think, this is generally the case, I think it safer to wait a few days until *decomposition* has taken place in the vessels, which result accomplished, they can be syringed and *sucked* out. When the contents of the root canals have not been removed at all, I would apply *nothing* to the cavity after removing the pulp *in the upper teeth*, and would only plug with loose cotton. The object is to have decomposition take place, which would be prevented by the application of creosote and similar remedies. When decomposition has taken place, the force of gravity will, to a certain extent, bring down the contents into the cotton. I think about three weeks a proper time to wait, after the death of the pulp, before filling, in this case. Then the roots should be thoroughly syringed out with tepid water, succeeded by alcohol, and, before plugging, wiped with creosote and tannin. In case of the *under teeth*, as the force of gravity would be likely to bring portions of the decomposed vessels through the roots, and there set up periostitis, I would proceed differently. As soon as the pulp is dead, I remove it, and if the root canals cannot be evacuated, I saturate their contents with creosote and tannin; at the end of a week I syringe them thoroughly with alcohol, and saturate again with tinct. iodine. At the expiration of another week I syringe again with alcohol, wipe with creosote and tannin, and immediately plug with metal, though I would never put in a *permanent* plug while any soreness of the tooth might start a suspicion of its permanency. I think an instrument for removing the

contents of root canals might be made which would add very much to our success in treating this class of teeth. I believe a small but powerful suction pump or syringe could be made with different shaped nozzles or points, to which soft rubber should be adapted in such a manner as to make the cavity to which it might be applied nearly air-tight. If this could be done, we can readily perceive that the contents of the canals could be readily *sucked out* when somewhat decomposed, and that we could be very sure of thus cleansing them perfectly. I hope some of my professional brethren who are more ingenious, and better mechanics than myself, will construct an instrument of this kind. Even if it should be *patented* I will not refuse to patronize it.

INDEPENDENCE, Iowa.

GUM ENAMELED GOLD PLATES.

BY DR. DAVID STEINBURG.

VULCANITE, as a base for artificial teeth, has received more attention, influenced more discussions, and received more condemnation than perhaps any other article used for that purpose. I have used this substance extensively in my practice since its introduction, and am well pleased with the results, yet I have found that it is not free from objections.

Observations made of cases in the mouth induced me to devise some means by which they could be removed, in which I was successful. Three years' trial and more than one hundred and fifty cases, approved of by the wearers, influences me in introducing it to the profession.

The improvement is called "Gum Enameled Gold Plates," for which I have received two patents. It consists in attaching the teeth to gold or platina plates by means of rubber or other vulcanizable gums, by which the gums, when vulcanized, serve as a means of strengthening and preserving the form of the plate, thereby giving it a permanency and finish unsurpassable. The advantages it possesses over other dentures lie in its close adaptation to the mouth, which prevents the accumulation of foreign substances. It is not much heavier than an ordinary rubber case. The plate should be very thin, so that when swaged it can be forced into every small cavity of the cast. The backing and soldering of the teeth is dispensed with; warping of the plate cannot take place, nor will it change form in the subsequent processes; alterations can easily be made after the plate is finished, without the necessity of again subjecting the case to the vulcanizer. Should a tooth or block get broken by accident, it can be replaced, leaving the plate as perfect as when first made. The expense in making a case is small, and the labor is but a trifle more than on an ordinary rubber case.

I am convinced that if this style of work is introduced to the community, and dentists give it a fair trial, it will soon establish its merits.

NEW YORK CITY.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF
PENNSYLVANIA.

REPORTED FOR THE DENTAL COSMOS BY R. J. HOFFNER, D.D.S.

A MONTHLY meeting of the Odontographic Society was held Tuesday evening September 6th, at the Philadelphia Dental College, Dr. J. Foster Flagg in the chair.

Written communications being in order, the following was read from Dr. R. Shelton Mackenzie, by the Corresponding Secretary:—

PHILADELPHIA, September 6, 1864.

MY DEAR DOCTOR:—In the event of my not being able, from a severe cold, of which I am only just recovering, to attend the meeting of the Odontographic Society this evening, will you kindly communicate the following for me?

At one of the meetings of the Society, which I attended, an interesting paper was read on the effect of dental disease on the human frame, in causing, or at least in increasing other diseases.

In Dr. Antommarchi's "Last Moments of Napoleon," it is recorded that on Christmas day, 1820, he long had "begged of Napoleon to allow his teeth to be cleaned, and he at last agreed. They were so loaded with tartar, this substance had so insinuated itself between the teeth, the gums, and the sockets, that the former were almost entirely detached. The four inferior incisors were entirely isolated, and no longer held."

When this was done, Napoleon's rest at night, which had been much troubled, became good, and from that time to his death, on May 5th, 1821, scarcely any mention is made in Antommarchi's journal, which he kept very fully, of a headache, which had previously greatly annoyed the illustrious exile. I suppose this does not surprise you, but I confess that it has strongly struck me, when casually reading the book, as strongly corroborating the views so clearly expressed in our colleague's excellent paper.

With best wishes,

I am ever yours faithfully,

To DR. MCQUILLEN.

R. SHELTON MACKENZIE.

The following paper was then read:—

"DENTAL HYGIENE."

BY ABR. ROBERTSON, D.D.S., WHEELING, W. VA.

Mr. President and Gentlemen:—With the hope of being instructed by the discussion that may follow, more than with any expectation of enlightening this society, (*i.e.* chiefly through selfishness,) I propose to call your attention to the above subject.

An experience of about twenty-five years in the care of the human teeth has most fully satisfied me that when a dentist has labored with the most devoted patience, and care, and skill, to perform, in the best manner, all the operations of a restorative kind required upon the teeth, and with all the success that such devoted patience, and care, and skill can hope to

attain, if he stops here he falls far short of having fulfilled his duty. That trite old saying is still true, that "an ounce of prevention is worth a pound of cure."

In a late number of one of our leading dental journals, copied from another dental journal, I find these sentences in an article of very considerable merit: "Clearly as it seems to be demonstrated that disease is engendered by impure air and filth, we doubt whether there could be as many facts brought forward to substantiate this opinion, as can be adduced to prove that the premature decay and loss of so many thousands of teeth is induced by well-known chemical action, arising from the accumulation of filth between and around the teeth, which the patient himself can prevent, and which no one else can. * * * * *

"Such, in a measure, is the position of the dental profession. Knowing full well the causes of the decay of the teeth, and that three-fourths of all that are lost could have been saved by having them kept clean, we have been content to treat them when diseased, giving merely a little *oral* instruction to each patient, (and quite too little of that even,) leaving the public at large in total ignorance as to the importance of keeping the teeth perfectly clean."

Is this good doctrine? Is it sound pathology? Are tooth-brushes and tooth-picks the only prophylactics necessary to prevent decay of the teeth? Or, are these, and any number of dentifrices and tooth washes added to them, sufficient for this purpose?

A decayed tooth was, probably, never seen in the mouth of a wild animal; in the mouths of domestic animals but rarely. They use neither tooth-brushes, nor tooth-picks! In the mouths of civilized men we sometimes find entire sets of teeth in the most perfect state of soundness and health, on which a tooth-brush never came; and we often find others which the art of man cannot permanently save from decay, on which the most scrupulous care has been bestowed, in the matter of their perfect cleanliness. Cleansing the teeth, then, cannot be all of dental hygiene; and I am not in the category of those "knowing full well the causes of the decay of the teeth," or of those who believe that "three-fourths" or even one-fourth "of all that are lost could have been saved by being kept clean." I humbly confess to a great degree of ignorance on this subject, and seek for "more light;" and, although many articles have been written on the importance (much fewer on the subject) of dental hygiene, it is still, to me at least, almost a *terra incognita*. Its maps and charts seem to have been drawn at random and by guess, and I confess to a feeling of bewilderment in attempting its exploration; but, if I succeed in traversing its shores, and in here and there erecting a light, it may demonstrate the feasibility of some abler mariner's entering its streams and navigating them to their sources.

The probability (I might perhaps safely say, the possibility) of pre-

serving the permanent teeth depends greatly on their perfect formation and development; and this perfect formation and development depends greatly on the preservation of the temporary teeth; and that these may be preserved requires that they should be alike perfectly formed and developed.

How shall this be secured? "Like begets like." Healthy parents usually, other things favoring, have healthy children, and feeble parents feeble children. In order to secure good teeth, the whole organization must be in good condition, and especially the digestive apparatus must be in such a state as to be capable of digesting and assimilating the aliments necessary for the formation of all the tissues of the body, teeth included. This is clearly proved by the often observed and well-known fact, that the process of the development of the teeth is frequently arrested by sickness; thus, it is no uncommon thing to find those teeth which were first formed, perfect; they having been formed while the child was in good health; then others, in the same mouth, which were in the formative state when a spell of sickness supervened, to be very imperfect, wanting especially in their enamel, this being deposited in too small quantity, sometimes only in patches; while others formed after the restoration of health have come quite perfect. Many, many times have I been able to indicate, within a very short time, the age at which an individual had had a severe sickness, by an examination of the teeth years afterward. To-day (Aug. 1st, 1864,) a very interesting case of this kind has fallen into my hands. A girl of fourteen years old, unusually large of her age, and of very healthy appearance, has very defective enamel on all of her incisors and cuspidati; their surfaces are extremely uneven, full of pits and corrugations; their edges serrated, and scarcely more than half as thick as they should be. This defect extends to only a portion of each of these teeth. The central incisors (first in forming) are defective in about half the length of their crowns; the laterals (later in forming) about two-fifths; and the cuspidati (later still) are defective only at their points—less than one-fourth of their length. The remainder of these teeth are remarkably well formed and strong in appearance.

Her mother informs me that during her fifth year she suffered greatly from various sicknesses, having had in that year, measles, whooping-cough, rash, and scarlet fever, since which time, *i.e.* since she was five years old, she has had uninterruptedly good health.

Then, to secure the perfect development of the temporary teeth, the foundation must be laid in the healthiness of the parents, before the birth, or even the conception of the child. And, especially during pregnancy, the mother must be so nourished as to be able to supply the proper elements for the full development of the fœtus; and, after birth, the child must be supplied with enough of sunlight, fresh air, and food of proper quality, to insure its future development and growth. In short, the pa-

rents must be instructed in, and practice, all the laws of hygiene in themselves and the child, to sustain the most perfect health; and, so far as the food of the infant is concerned, there can be no doubt that the most suitable—the best—diet is that which nature—the God of nature—has provided for it, and for the young of all mammalia, its own mother's milk. This, the teachings of chemistry, and thousands of years of experience, show to contain all the elements necessary for the perfect development and growth of all parts of the organization, and in such a state as to be the most readily and easily appropriated to the purpose.

After the temporary teeth are developed, whether perfectly or imperfectly, it is of great importance that all possible care should be used for their preservation for the full term of their necessity, *i.e.* till their places are supplied by the permanent set; for they are important, very important, in many respects.

In order to the proper nourishment of the body, at any period of life, it is necessary that we have not only the proper food, but that food must be perfectly digested and assimilated. Without this, perfect health and vigor cannot be maintained. Food is much sooner and more easily and perfectly digested when thoroughly insalivated and comminuted by mastication, than when ingested in a cruder state. This fine comminution of the food allows the gastric juice to come in contact with, and to exert its solvent powers upon all its parts at once, instead of commencing on the surface and slowly and tediously working its way through the mass, as it must do if the food is bolted into the stomach in lumps. Food cannot be thus thoroughly masticated without good teeth.

When the first teeth are allowed to decay until their pulps are exposed, or nearly so, they subject the little patients to all the excruciating pains that adult teeth are liable to produce when in a similar state, with the same train of consequences, as loss of rest and sleep, dyspepsia, fever, etc. It is therefore important, if these fall into decay, that the same means be used for their preservation as for the permanent teeth. If the time and occasion allowed, I would here make some remarks on the evils of too early removing the temporary teeth to make room (?) for the permanent set; but the time will not permit, and I trust that this is not an occasion where such remarks are needed. But there is one other reason why the temporary teeth should be retained, if possible, until nature removes them, to which I will briefly allude, to wit: they are probably of service in the formation of the permanent set.

"The mills of the gods grind slow," but they are very sure, and they work carefully and economically. Everything in nature has its use. Here is the proper material ready at hand. It has been formed into the temporary teeth. They have served their purpose; and now the little gems are to be removed to make room for their more permanent successors. Their roots are dissolved and absorbed, to loosen and throw off their now use-

less crowns; and I have no doubt their lime is re-deposited to aid in forming the permanent teeth; otherwise there would be a bad waste of one of the most important and abundant materials in the organization.

A large share of the whole weight of the body is composed of lime, found chiefly in the bones and teeth; and these, like all other parts, are subject to the law of waste and supply, (unless the enamel of the teeth, which has no periosteum, may be an exception.) It is therefore evident that if the supply of this material is insufficient, this waste cannot be supplied, in which case the bones must become enfeebled, and the teeth decay, if this deficiency occur in adult life, or they will be but imperfectly formed and developed if it occur during adolescence. And, although lime is found in some quantity in most articles used as food, and is one of the most generally diffused and abundant of all the substances of which our globe is composed, it is not unfrequently found wanting in the human system to such an extent as to impair the solidity and strength of the bones and the perfection of the teeth, and is therefore not so abundant that nature would likely afford to throw away that amount ready at hand and in the system and already prepared for use. But, although so large a quantity of lime is necessary for the perfection of the bones and teeth, and although "a living body has no power of forming elements, or of converting one elementary substance into another, and it therefore follows that the elements of which an animal is composed must be the elements of its food," I am satisfied, and that contrary to some of my previously conceived opinions, that the lack of this element, when it occurs, is more frequently a want of power to assimilate it when in the system, than of a deficiency in the amount ingested.

I have been led to this change of opinion by the observation, frequently made, that persons living in regions of country where the formation is limestone, and the waters all strongly impregnated with that material, affording enough, and more than enough of lime, to compensate for its deficiency in other respects, if such deficiency there be, suffer no less from defective and decayed teeth than those living in granite regions, and where the waters are almost entirely free from lime. And in those parts of Switzerland where cretinism prevails, there is said to be no lack of lime in the waters or in the articles of food ingested; but there the people subject to this disease are miserably poor and ill-fed, neither obtaining a sufficient quantity or a suitable quality of food to sustain vigorous health. In cases of rickets, too, the cause no doubt is either poor and insufficient diet, and badly ventilated lodgings, or otherwise improper, and perhaps too abundant diet, with a lack of the power of assimilation and digestion.

Our food, then, must not only contain the necessary elements to form and sustain the various parts of our organization, but it must be in such a state when taken into the stomach that it can be digested, and the stomach and other organs of the alimentary system must be in such a state

as to be able to digest and appropriate this food, or it cannot meet the requirements of life and health. Food, too, may contain all the necessary elements, but be so badly cooked, or otherwise so illy prepared, as to render it indigestible and unassimilative by the most healthy organs.

Numerous experiments have established the fact that many articles in their natural state, or rather in their entirety, are wholesome and nutritious, but, when divested of all extraneous matters, leaving such only as chemistry teaches us are the very elements of the organization, are not capable of sustaining vigorous health, or even life, for any great period of time.

This is perhaps true of all the elementary principles, that none of them can sustain life for any great length of time unmixed with other ingredients. These coarser materials, though they may contain no elements of nutrition in themselves, seem necessary, as, it may be, chemical reagents or solvents, or, by their mechanical action on the alimentary canal, to keep the system in a condition to act on the real alimentary principles ingested.

I at one time was strongly of the opinion, that one great cause of the remarkable defectiveness of the teeth of the American people was, that we took so much care to bolt and refine all the bran from one of our great staples of life—wheat, that with that bran we removed nearly all its lime, and therefore our food was deficient in that element; but I am now as well convinced that we suffer far more, in so far as our teeth are concerned, from this cause, in our digestive and assimilative powers, than by any deficiency in lime that it creates; and for the reason before stated, that persons living in limestone regions suffer as much from decayed teeth as do others.

We are a nation of dyspeptics as essentially as we are almost a toothless nation. Yes, now *almost*, and fast becoming entirely so. So fast, that unless some change is effected in our manner of life, in a very few more generations that event will overtake us.

Dyspeptics always have bad teeth.

It is the opinion of many, not only of our own people, but of foreigners, that our climate has much to do with making us pre-eminently the greatest sufferers on the earth from defective teeth.

Has our climate any such influence? There are many considerations that induce me to believe not. None, of a general character, that induce me to think that it has.

And, first, we have nearly every variety of climate of the whole globe, and I am not aware of any marked difference in the state of the teeth of the people of different sections—other things being equal.

I have never heard of, neither do I suppose that such a thing as a decayed tooth was ever found in the mouth of a wild animal in this or any other country. And I suppose that such a tooth is but very rarely if ever

found in the mouth of any domestic animal on any farm or plantation in the country, if kept as they usually are on farms and plantations, or not more so than in other countries; but it is no uncommon thing for horses and cows, in cities and towns, kept in dark and ill-ventilated stables, and highly pampered, to have decayed teeth. Cows, kept at breweries and distilleries, and fed on hot slops, to them a very unnatural diet, notoriously soon become diseased—I suppose dyspeptic—and lose their teeth.

The Aborigines of America, throughout its whole range of territory and of climate, are rarely if ever afflicted with bad teeth, unless there may be some exceptions in cases where they have become more or less civilized.

Then it is not climate that destroys our teeth. This as a general proposition I believe to be strictly true, though from peculiar causes I have no doubt that the atmosphere in some localities may be in such a state as to exert a deleterious effect on the teeth, and that a want of proper ventilation, wherever it occurs, has much to do with it, I have no doubt; but as these do not properly come under the argument in relation to climate as pertaining to our country more than to any other, I shall not enter upon their discussion now.

But, though the climate has no marked effect upon our teeth, our food and manner of living undoubtedly have. On these points I have made many inquiries, extending to many nations; the results of which have all tended to the same conclusion; but want of time will compel me to speak only in generalities.

In Asia and Africa the people are but little confined to indoor life. Their diet is very simple, consisting chiefly of rice, though in some parts, of wheat and other cereals, and some of the leguminous seeds, fruits *in their natural state*, and but very little animal food; and in both these great regions such a thing as a decayed tooth is hardly known. A very intelligent gentleman, who has resided five years in India, assures me that he does not believe that there is dentistry enough required in all that vast country to support one dentist.

The peasantry of all European nations, of both sexes, live much in the open air, and subsist on a very plain diet; the *leading articles* of which are potatoes, and some other vegetables, black bread made of *unbolted* wheat and rye mixed, or of wheat and barley; oatmeal; milk and its products, especially cheese, and but very little animal food. With this class of people decayed teeth are very rare; and dyspepsia hardly known. But, in these same European nations, when we leave the country and come into their cities, with their narrow streets and many-storied houses, where ventilation is imperfect, and where even the outdoor air must necessarily be very impure, and where the people live more luxuriously, and consume a much larger proportion of animal food, dyspepsia is much more common, and the teeth suffer in proportion, or, as a physician who was born and educated in Germany said to me, very graphically, “the people in the coun-

try in Germany scarcely know anything about decayed teeth, but when you come into the cities, the people live as highly, are as corrupt, and suffer as much from their teeth as you do in this country." Such is, essentially, the testimony of others, of whom I have inquired, in regard to the condition of the teeth of those living in the country and in the cities of other European nations.

Emigrants, from whatever country, after being here long enough to adopt our mode of living, and to raise families, though they may, and often do, suffer from this cause, generally have far better teeth than their children; which can be accounted for by the fact that their original manner of living was better suited to the development of the teeth than is ours; their teeth are therefore more perfect than their children's, and consequently better able to resist the deleterious influences to which they are subjected. Their constitutions too are better able to resist. In this way, and in no other, can this fact be satisfactorily accounted for.

The rule seems general that all people who live plainly, and have an abundance of fresh air and sunlight, have good teeth; while those restricted in these, and who live luxuriously, and "fare sumptuously every day," suffer from decayed teeth. Especially do we find this to be true in relation to the peasantry and the citizens of the different nations of Europe.

In this country, we have no class of people, in any particular, (except in the mere fact of living in the country,) at all comparing with the peasantry of any other nation. Indeed, it has been said that there is no peasantry in the United States. The genius of our constitution and laws tends to foster equalization among all classes, and this is carried out to a very great extent, not only in our voting but in our eating, and other modes of living; the leading articles of diet being nearly the same in all parts of the country, both in the cities and rural districts; meat being everywhere the leading article. Next to this, bread made of finely bolted wheat flour; corn bread is also used to some extent, in all the States, and in the Southern probably predominates over the wheat. Next to these, potatoes are the most important article of food, and then various other kinds of vegetables, and, of the leguminous seeds, peas and beans. Pastries, puddings, custards, and jellies are also extensively used everywhere; as is also butter and cheese, and various kinds of fruits and nuts, domestic and foreign, and frequently all of these appear on a table at once, to say nothing of the soups, fish, poultry and game.

In the cities, it is true, many of the people live more luxuriously than most of the people in the country, and load their tables and their stomachs with a greater variety, and with more incongruities at the same time; but still, as I have said, the leading articles are the same in town and country—meat and fine flour bread; and a very large share of our people—probably a large majority of them—eat meat three or more

times a day, and that to the full; and nearly all the rest eat it at least twice a day! This is the habit, not of the adult portion of our people only, but of the children too, and that of all ages. Children, before they are weaned, even before their temporary teeth have come, are fed on meat! Are we wiser than our Maker! Has the Almighty made a mistake in not furnishing children the means of masticating solid food from the time of their birth? Or are we wrong in thus feeding them? If He had deemed it necessary for children to eat meat, or other solid food, before they were weaned, he would, beyond all doubt, have given them their molar teeth before he gave them their incisors, for he invariably adapts everything in the most perfect manner, to the purpose for which he intended it. Mothers, no doubt, would greatly appreciate this kind of arrangement, as it would save them many a sharp nip in a tender point.

From all that I can learn from statistics and from travelers, we eat not only vastly more meat, and a greater variety of food, especially at the same meal, and in altogether larger quantity than any other people, except those living in high latitudes, where a very large amount of carbonaceous food is required to maintain animal heat. We also take more care to exclude the sunlight from our houses than any other people.

So far, too, as I have been able to learn, from observation and inquiry, the people of all nations, who live abstemiously, and enjoy heaven's light and air without restriction, have an immunity from dyspepsia and from decayed teeth; while those who deviate from the just laws of hygiene, founded on the requirements of our natures, suffer in proportion to the extent of that deviation.

As the American people, as a whole, live more luxuriously than any other people, and also exclude themselves more from air and sunlight than any others, it might naturally be inferred that they should suffer more in these respects. Such is the fact, too, in an eminent degree; so much so that it has become a proverb, that America is the paradise of dentists.

But this deduction, from a comparison with other nations in regard to diet and other hygienic conditions, is not all. Illustrations, demonstrations, have been afforded, on this point, by the most wicked rebellion by which the peace of our country is now so sadly disturbed.

I have already said that teeth cannot be well formed, or sustained in a perfect state, without good general health; (even savages, who have scrofula, and some other, to them rare diseases, are subject to decay of the teeth.) Now, it has been stated, on apparently good authority, that the rebels have improved in their sanitary condition, and in their power to resist the effects of wounds and surgical operations, while their rations have been greatly diminished. At this time their ration being reported to be sixteen ounces of corn meal and four ounces of bacon per day. Now, bacon has not generally been regarded as the most wholesome of meats, nor has Indian-corn been regarded, nor does chemistry show it to be, the most

nutritious of the cereals; and yet on this diet, and thus limited in amount, the rebel army are said to have greatly improved in their sanitary condition, during the last two years, while, on the other hand, our own armies, who are fed to the full, on fresh beef and wheat flour bread, are in a less perfect condition now than then.

We are, proverbially, the greatest sufferers from decayed teeth, and also from dyspepsia, of any people on the earth; we eat more, and are more regardless of hygienic laws than any other. The argument and the deduction then seems fair, that our food has much to do with our sufferings in both these particulars. And here, I have no doubt, is the chief cause of difference in the state of our teeth, and those of the people of other nations. But, although the chief, I do not suppose it to be the only cause of difference. For example, the females of this country, though born of the same parents, and fed on the same food, suffer much more, as a general rule, from decayed teeth, than do the males. Is this strange, or unaccountable? While little children, they are usually kept indoors more than boys, and so soon as they have attained to the dignity of *long dresses*, they are shut up still more closely; and when they do appear abroad, they must *walk* with due circumspection; and lest their hands or faces be tanned or freckled, by exposure to either air or sun, they must be protected by gloves and veils, and these surmounted by parasols; so that during the little time that they may be out of doors, they are almost excluded from the benefits of sun and air. But it is to the houses, to which they are so closely confined, that attention should be called. Where shall we find a room, in any house, in all the country, dignified by the name of parlor, from which the light is not so secluded by curtains, and blinds, and shutters, that a fly cannot see to navigate it? In such rooms as these our females live, and wonder why they are so afflicted with feeble health and loss of teeth! A very familiar illustration of the effect of the seclusion from light and air is any plant growing in a cellar, or even in the shade. It is always pale, feeble, attenuated, and unproductive. Another marked illustration is the effect of a few months of close prison life, on the most robust man. How soon he becomes pale and enfeebled! The females of no other nation, so far as I can learn, so seclude themselves, nor so darken their houses, nor are they as feeble as ours.

Although I am fully persuaded that diet and domicile are the chief causes of the decay of our teeth, they are not the direct and immediate cause. These are the causes of dyspepsias, neuralgias, rheumatisms, gout, fevers, etc. One of the most palpable effects of most diseases is a change of the glandular secretions. Most of these diseases change the saliva from its naturally slightly alkaline to an acid state; and all acids coming in contact with the teeth affect them injuriously, in greater or less degree, according to the kind and strength of the acid. I do not therefore deny that "the decay and loss of so many thousands of teeth is

induced by well-known chemical causes," or that an "accumulation of filth between and around the teeth" has not some influence of this kind—enough to make a reasonable degree of care important, and especially as cleanliness has well been said to be akin to godliness. But that this kind of neglect is the chief cause of their decay and loss, or that any amount of care can prevent but a comparatively small part of them from this catastrophe, without regard to the more important matters to which I have referred, I do not believe; and placing so much stress on this one point, as is so often done, is but tithing "mint, anise, and cummin," while omitting the "weightier matters of the law." This, verily, ought to be done, but the others should not be left undone.

It is the almost universal belief that medicines are the great destroyers of the teeth. This, though almost entirely erroneous, is not, after all, so very strange an error. As already intimated, most diseases change the character of the secretions, and thus injure the teeth. Medicines are mostly taken during sickness. This quite satisfactorily accounts for the mistake; but as I have already written, somewhat fully, of the effects of bodily diseases upon the teeth, I shall not enter upon that subject now, further than to say that during all kinds of disease which produce an acid reaction of the saliva, some kind of antacid wash, having a stronger affinity for the acid than has the lime of the teeth, should be most sedulously and frequently used. In this way a vast number of teeth may be saved.

There are some other points to which I had intended to allude; but I have already extended this so far that I fear I have overtaken your patience.

Dr. Garretson thought that diseases of the teeth required treatment upon the same principles that were demanded in other diseases, calling for the same general education which would enable a man to meet disease in the system.

Dr. Lusson stated a case which had come under his notice of a French gentleman, about fifty years of age, in whose mouth the efforts of nature had resisted decay to such an extent as to prevent caries, although manifested, from making any material advance during a number of years. He thought, from his experience, that the French had better teeth than had the people of any other nation, and this he believed due to the fact that their food was thoroughly prepared, and that they took more care in eating only such as was perfectly done.

Dr. McQuillen, while agreeing in the main with Dr. Robertson's paper, yet differed with some of the views advanced, particularly respecting the relative decay of the teeth of different nations. He did not believe the teeth of Americans worse than those of Europeans. American dentists abroad are reaping the benefits of lucrative practices, due, doubtless, to the fact that the people have since their advent learned the necessity and advantage of paying more attention to their teeth than

heretofore. Owing to the general distribution of wealth, among the *many*, rather than being confined to the *few*, as in other countries, our people have been more attentive to their dental organs, and hence have been considered as possessing universally bad teeth when compared with other nations. He had sometimes thought of addressing professional men who had studied dentistry in America, and are now practicing it abroad, upon this subject, with the view of determining more clearly an approximation to the truth.

Defective assimilation, beyond a question of doubt, in the majority of cases, was the great cause of imperfection in the bones and teeth, rather than that the food is lacking in essential elements. He had a case under treatment at this time in which there was a material want of enamel structure. The teeth are deeply pitted, presenting a ragged, unsightly appearance. At two years of age the bones of the patient were so soft that the child was unable to stand, and, being very deficient in lime, the limbs could be bent or moved about in the most surprising manner; the teeth suffered in common with the bones. The assimilative process has since greatly improved, and the osseous system of the patient has recovered entirely.

Dr. Garretson said that if a case presented itself in his office, his first endeavor would be to discover whether any systemic derangement existed, just as he would do if a disease other than one pertaining to the teeth were manifesting itself. Suppose, for instance, a mouth in which several carious cavities were observable, should be inspected, and the application of a piece of litmus-paper proved an acid state of the saliva to exist. Certainly a constitutional treatment which would bring the saliva to its normal alkaline condition would be of much more service than the mere plugging of the decayed tooth.

In some systems a great recuperative power naturally existed. An operation which he had performed a short time previous, that of removing a hand that had been greatly mangled by being caught in a circular saw, healed rapidly by first intention, although no particular attention was paid to the wound after the amputation. In another case, the same rapid healing took place where he had amputated the leg of a boy, four years old, who in four weeks was out playing with his little companions. This same strange power of the system to resist disease, manifests itself at times in the dental organs, where, after decay has begun, its course is so slow as not to afford detection.

In these cases, nothing is due to the practitioner, but everything is accomplished through the wonderful recuperative efforts of nature.

Dr. Flagg said that his position upon this occasion had been one more opportunity of impressing upon his mind the unenviable character of duties which were entailed by presiding, in contradistinction to pleasures which were enjoyed by those who were privileged to participate in dis-

cussion at the moment of desiring to do so. It seemed to have become a tacit understanding that a summary canvassing of the various opinions advanced during discussion, should be indulged in, when in due time it was in order for the occupant of the chair to offer his contribution to the evening's exercises; he, however, declined this task, and proposed confining himself within such limits as the advanced hour seemed to dictate as proper.

It had been stated that dental hygiene resolved itself into the treatment of each individual case from the constitutional stand-point, but he objected to this disposition of the subject, as vague and unsatisfactory. It would not be so were the profession entirely agreed as to the constitutional or local medication for particular cases, but upon this very point it was so diversified as to render it simply folly to adopt the method too frequently indulged in of finishing an elaborate history of some interesting case, with the *information* (?) that the patient improved wonderfully under the "appropriate treatment!" He thought that, without being egotistical, he could claim that he *ought* to be able to appreciate what was meant by such communications or remarks, but the results of the employment of the same remedies by different practitioners were so diversified that he confessed to very little enlightenment on the "appropriate treatment" question.

The remarks of Dr. Lusson had called up the recollection of a number of French patients for whom he had, at various times, performed operations, and he corroborated the views of that gentleman so far as his experience went, in the matter of excellency of tooth structure pertaining to individuals of that nation; he could not, of course, advance it as an opinion, that, as a nation, the French possessed superior teeth, but merely gave it as most decidedly so according to his opportunities for observation.

He had noticed that at different periods of life the teeth seemed more or less liable to decay; at times, say from 13 to 19; from 30 to 35; from 55 to 60; apparently requiring much attention, and comparatively exempt from the ravages of decay at intermediate periods; he was inclined to suggest that this might be due to concentration of vital force upon the development, nutrition, or preservation of more important tissues or organs during these seasons of life.

He thought *local* hygienic treatment should command more assiduously the attention of dental practitioners, because of the facility of more readily, and consequently more effectually, directing habitual medication in this manner. Instanced several cases of marked benefit accruing from constant use, locally, of precipitated chalk, lime-water, or bicarb. of soda, according to the strength of antacid application required; these to be used once, twice, or even more frequently, daily, as indicated.

One point he desired, with all respect to the views of the author of the

evening's dissertation, to take exception to. He regarded it as the object of any paper to elicit not only an expression of views, but, if possible, the antagonism of friendly controversy, and he would therefore dissent from the position, that any tangible effect upon the formation of the permanent teeth was due to the material placed in the circulation as the result of the absorption of the roots of deciduous teeth.

He could not give his views upon this subject at length without trespassing too much upon the time of the present meeting; but contended briefly, that even if were granted, that the entirety of material appertaining to the roots of deciduous teeth, which by the processes of nature become *at any one time* again components of a circulating medium, were truly recrementitious, that they would not form any notable part of the amount necessary to the formation of such an extensive tooth production as was in progress at any given period; and that as we were taught (admitting the truth of the doctrine merely for the argument's sake) the whole osseous system was indebted for nourishment to the same compounds as were the teeth, by far the larger portion of even the small amount in question would, in all probability, be diverted from again entering into tooth structure. Again, far more than enough supply to answer the demand for tooth construction could readily be found in the food used for daily consumption; and, finally, he could not think that he had ever observed any effect announcing any *want of material for the formation of the permanent teeth*, which could by any possibility be ascribed to the removal of the deciduous teeth, roots and all, by extraction.

Dr. Garretson agreed with Dr. Flagg in the belief that the lime of the temporary teeth did not go to help form the temporary teeth. He could hardly see the necessity of nature's caring for the small amount of substance thrown off from the temporary teeth, when it existed in such quantities in the system.

Dr. McQuillen recognized that there is in reality no such thing as *destruction* or *annihilation* in nature, and that such terms are merely conventional, and employed in explanation of the *changes* which are constantly taking place, not only in the *organic*, but also in the *inorganic* world; whereby the *elements* which form different *compounds*, when their affinities are satisfied, or they are acted upon by external influences, separate, only to unite again and form *new combinations* or *compounds*; in other words, that in nature's operations nothing is *wasted* or *lost*. Applying these principles to the subject under consideration, he favored the view advanced in the essay of the evening, relative to the reappropriation of the earthy constituents of the deciduous teeth by the human economy. In the disintegration which is constantly taking place in the tissues, there are certain portions which, in every sense of the word, are *excrementitial*, and must be voided by the organism, or disease and death will speedily follow, but there are other portions which are *recreo-excre-*

mentitial, and these, by undergoing purification, can be refitted for the nutritive process. This he believed more than probable in the case of the phosphates and carbonates of lime and other salts which enter into the composition of the deciduous teeth.

Dr. Lusson thought that if nature did not need the lime in the temporary teeth she would push the teeth from their sockets, roots and all.

Dr. Garretson did not agree with this position, as such a condition would, for the time being, be a source of much suffering to the patient. He considered that the most natural way for nature to remove the temporary teeth was by the absorption of their roots.

Adjourned.

MASSACHUSETTS DENTAL ASSOCIATION.

At a meeting of this Association, held in Boston, Sept. 5th inst., it was unanimously voted; that

Whereas, John A. Cummings, of this city, has taken out letters patent, thereby vesting in himself the exclusive right to use India-rubber and all other gums for artificial palates, or plates for the base of artificial teeth; therefore

Resolved, That the Massachusetts Dental Association solicits the cooperation of all dental associations and societies, and all others interested, in testing the validity of said letters patent in such form and manner as the exigency of the case demands.

Resolved, That all associations and societies, and others who may take action in the premises, are requested to report the result thereof to Dr. E. C. Ralfe, Corresponding Secretary of this Association.

Resolved, That a special committee of three* be appointed by this Society; that they be and are hereby authorized to obtain, upon such evidence as may be had, a legal opinion on the validity of the said letters patent, obtained by the said J. A. Cummings, and report the same at a subsequent meeting.

Voted, That the Corresponding Secretary be instructed to send copies of the above Resolutions to the several dental journals, and ask to have them published.

E. C. RALFE,

Cor. Sec. Mass. Dental Association.

EDITORIAL.

APOLOGY.

WE much regret that sickness in the family, and death of a near relative, at the time set apart to write, prevented us from preparing our editorials. We will give double amount next time.

J. D. W.

* The committee consists of Drs. N. C. Keep, I. J. Wetherbee, I. A. Salmon.

ERRATA.

IN the article on Temperament, No. 3, by Dr. Atkinson, published in the September number of the DENTAL COSMOS, two paragraphs on page 60 are rendered obscure by the punctuation and typographical errors. They should read as follows:—

These are—1. Most indifferent, Nervose. 2. DERMAL. 3. Glandular. 4. VASCULAR. 5. Sanguine. 6. OSSEOUS. 7. The most different, Crystalline.

Thus we see that the body is first one sea of nerve mass, or unpronounced mucus. Next this sea becomes inclosed in a skin of oxidized mucus, constituting a cell or proper prototype of vessel, which, by modification of its character and relations becomes, serially—Glandular body, Vascular (sanguine) body, and Osseous—which in the best examples of enamel is a distinctly crystalline—body.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

DENTAL REVIEW, LONDON—JULY.

THIS number of the *Review* comes to hand with a table of contents comprising a variety of articles which is calculated to meet the wants and satisfy the demands of its subscribers in every direction. In the original department, in addition to the articles on Exostosis, from which the accompanying extract is made, and one by Mr. Williams, Mr. Hulme continues his interesting communications on the "Origin and Development of the Superior and Inferior Maxillary Bones." The republication, with a number of excellent illustrations, of Prof. Fergusson's Lectures, delivered before the College of Surgeons, London, on "Hare-Lip, and Cleft-Palate," and the operations connected with them, will prove of service to those practitioners of dentistry who have not paid much, if any attention, to those subjects. Dr. Ballard's paper read before the Odontological Society, and the ensuing discussion, are well worthy of a careful perusal, and it is a matter of regret that limited space only admits of the presentation of a few extracts.

"ON DENTAL EXOSTOSIS. By WILLIAM PERKINS, L.D.S.R.C.S., Dental Surgeon to the National Dental Hospital.—Exostosis has sometimes been divided into three kinds or varieties—as ivory, lamelated exostosis, and spongy exostosis. I prefer to use my own designations for this paper, and to call the varieties bulbous, granular or spicular, and opaque. By bulbous is meant that kind of exostosis which assumes somewhat the shape of a pear or similar formed substances, and is perfectly smooth and

regular on its surface, is semi-transparent, and appears in substance to resemble the cementum of the tooth in its ordinary state, the difference being principally in quantity. By granular or spicular, is meant that kind of exostosis which is deposited on the tooth in uneven patches, the patches themselves presenting somewhat the appearance of a number of grains placed together; sometimes each grain having rather a rounded form, while at other times they are jagged and sharp—the whole somewhat resembling in appearance the excrescences frequently found on old trees. The opaque kind is that which has a whitish appearance and lacks the transparency of the cementum as generally seen, and is frequently an accompaniment to unhealthy and painful absorption of the fang.

“The bulbous kind, as far as my experience has shown, is by far the least troublesome to the patient, as I have met with many instances where the tooth has been exostosed to an enormous extent, but no pain has been complained of until the tooth has become troublesome, through absorption of the alveolus; and even then, in cases where the tooth in question has been an upper molar, two fangs out of three have quietly necrosed, while the third, having the only attachment to the gum, has set up inflammation, and caused sufficient pain as to call for its removal—an operation, in such cases, very easily and speedily performed. This kind is frequently found on perfectly sound teeth; and when it has arisen from a diseased state of the general structure of the tooth—such an exposure of the pulp leading to its destruction, followed by disturbance in the periosteum—the pain arising from the exostosis is not of that severe kind as is found in the other forms. The granular or spicular form is always accompanied with a great amount of suffering, always with inflammation, and frequently with abscess; it appears to be of rapid and irregular growth as compared with the first-named forms, and always found on very diseased teeth.

“The suffering accompanying this form of exostosis is in some cases frightfully acute and continuous, relieved only by powerful narcotic doses or *cured* by the extraction of the offender. The opaque kind, as has been before mentioned, is often accompanied with absorption of the fang; so that there appears to be two contrary diseased actions going on in the same tooth, the fang thickening and shortening at the same time: and this occurs sometimes to sound teeth in the mouths of young people. At other times the teeth are badly decayed, with periostitis and sometimes abscess. The amount of suffering experienced in this form of the disease varies considerably.

“First. If the tooth happens to be a sound one, the pain is seldom continuous, but comes on occasionally by violent shocks, continuing for a longer or shorter period. The paroxysm being over, the tooth gives little or, in some cases, no trouble, until a return of the attack; and this state of things will go on occasionally for some length of time, the paroxysms being controlled generally, more or less, by the general health. Ultimately, however, the attacks become so frequent and severe that the patient in desperation submits to extraction; the root in that case presenting a shortened and somewhat rough appearance, with a very *red point*.

“Second. The tooth is much decayed, has formerly given some amount of pain, in some cases it has been stopped, in other cases it has been left to itself, in both cases the pulp is gone; no pain has been experienced probably for four or five years, or even a longer period, and no bad taste or affluvia proceeds from the tooth. At length an uneasiness is felt in

the gum or above or below the tooth, as the case may be; it is *uneasiness*, not absolute pain; and this is capable of being relieved by the application of a leech, with the addition, if necessary, of a little tinct. opii, etc. In many cases the trouble will pass off for a time, and return after awhile, amenable to its former treatment; and so, in some cases for years, a tooth of this kind may be made bearable and even serviceable if its early warning be attended to, the result in some cases being severe and continued pain that will not yield to treatment; while in others it will necrose, and either fall out or be extracted on account of its looseness. A tooth of this kind that has been occasionally successfully treated, but has at length become unyielding, and as a last resource is extracted, generally presents a shortened and rough appearance, the extreme end frequently opaque and nearly white, while the parts nearer the crown are semi-transparent.

"There are, however, some cases of exostosis where the fang is not at all diminished in length, where the disease has formerly been what is here termed bulbous, but which upon extraction exhibits the peculiar whiteness and opacity before spoken of.

"Third. The tooth in this case is decayed, the pulp in a state of supuration and absolutely putrid: the pain here is always very great, and the gums much swollen and excessively tender to the touch. If the disease be allowed to proceed, it will result in alveolar abscess. A tooth in this state should be at once removed, as, if the inflammation should subside for awhile, it is certain to recur at no distant period; added to which, the tooth is always more or less offensive. A tooth extracted under these conditions generally presents an opacity of appearance and very frequently a large amount of absorption: in some cases the absorbed portions are merely rough, presenting the appearance of a broken fang with the edges rubbed off; in others the points of the fangs are pointed and almost as sharp as needles; while in others the foramina of the fangs are very much enlarged."

"ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.—Monthly Meeting, June 6th, 1864. EDWIN SAUNDERS, Esq., President, in the Chair.

"*Closure of the Jaws from Cicatrices*.—Mr. COLEMAN read a paper relating a case of closure of the jaws from cicatrices, under the care of Mr. Cartwright, at the Dental Hospital of London—successfully treated. On the 5th of August, 1863, Elizabeth Long, æt. thirty-eight, an anæmic and delicate-looking woman, came to the hospital, having several carious teeth on the left side in both upper and lower jaws. On the right side were three distinct bands of fibrous tissue of cartilaginous hardness, extending from the gum at the necks of the second bicuspid and molar teeth of the upper jaw to the same position in the lower jaw, and so unyielding that the forefinger could only be introduced with the greatest difficulty between the cheek and teeth on that side when the mouth was opened to its fullest extent, and not at all when the mouth was closed. She had lost the three molars in the upper jaw, and the two bicuspid were much out of place, leaning forward. In the lower jaw the crowns of the three molars projected very much inward at an angle of about 45° with the gum. The patient could only separate the front teeth, and that with difficulty, to the extent of about one-third of an inch. At the age of eleven years she had typhus fever, followed by abscesses, some of which

opened into the mouth, and shortly afterward her teeth became elevated; pieces of wood were forcibly driven between the teeth, which caused her jaws to be separated for a short distance. She suffered great pain for about six months, when a piece of bone, of a triangular form, an inch and a half in length, and half an inch at the base, came away from the lower jaw. On the 12th of August last year the most prominent cicatrix was divided, in order to allow room for the removal of the second and third molars, and to allow the extent of the other cicatrices to be ascertained. On the 19th the patient was placed under the influence of chloroform, and the cicatrices were freely divided, after which the mouth could be forced open to its natural limits. A plate was introduced to prevent the cicatrices from uniting. A few days afterward a new plate was inserted, constructed to allow pieces of vulcanized rubber to be added from time to time to its upper surface; the effect of which was to keep the jaws apart. That treatment continued until November, when the mouth was fully distended. She had since gradually discontinued the use of the plate, only wearing it an hour or so in the week as a precaution. Her mouth closed well, and the position of the teeth had been very little altered by the treatment employed."

*"On the Constitutional Ill Effects of Fruitless Sucking and the Diagnostic Value of Deformed Jaws in relation thereto.—*Dr. THOMAS BALLARD read a paper on the above subject. He said: About eight years ago he was anxiously engaged making clinical observations upon the diseases of children, when he became aware of the fact that the thrush was not essentially that which it was usually held to be, viz., the growth of a fungus in the mouth and intestinal canal; but, so far as the mouth was concerned, it was simply the result of mechanical friction of the mucous membrane, caused by the child sucking forcibly to obtain its food. When he prevented the hard sucking, the mouth got speedily well, and the green stool diarrhoea, which usually existed, ceased also. He also met with some cases of the gelatiniform softening of the stomach. The usual explanation of which, that the tissues had been acted upon, or partially digested by the gastric juice, seemed to be the most reasonable, but it had always been held that this process could only take place after death. Dr. Brown-Séquard was lecturing at the College of Surgeons about that time, and one of the experiments mentioned by him seemed to afford a key to the solution of the problem. The experiment was as follows: Having a dog with a fistulous opening into the stomach, he placed a ligature round the œsophagus, and opened this tube above the ligature. The dog was deprived of food for some time, until, in fact, all secretion from the stomach had ceased; food was afterward given, which, though swallowed, did not reach the stomach, as it passed out of the œsophagus above the ligature. The effect of this fruitless eating for a space of two hours was to cause the secretion of a large quantity of gastric juice—some pints, which was drawn off by means of a glass tube inserted into the fistula. From this experiment Dr. Séquard inferred that the excitation of the nerve of taste caused a reflex secretion of gastric juice. He (Dr. Ballard) saw the analogy between the fruitless eating of the dog and the fruitless sucking of the infant, and caught the idea that gelatiniform softening of the stomach might be the effect of the large secretion of gastric juice, and that the green discharges from the bowels were the evidence of

that process going on; and all his subsequent observations had corroborated that. * * * * *

"Before concluding, he was desirous to direct their attention to another defect of the teeth resulting from fruitless sucking. The irritation of the gums, which was set up by the constant friction, interfered prejudicially with the growth of the incisor teeth. He had a model from a child who suffered much in infancy from fruitless sucking, and had since been a great sufferer with fits and hydrocephalus. The incisor teeth very soon rotted away. In reference to the permanent incisor teeth, he believed the serrated and honey-combed varieties were the result of some form of fruitless sucking during the first three years of life. To illustrate that, he mentioned the case of two brothers: one was fed by a bottle and acquired a retained habit of sucking the blanket, and he had serrated permanent incisors; the other was spoon-fed, did not acquire a retained habit of sucking, and his permanent incisors were perfect. The points he desired to see recognized were, that the serrated and honey-combed incisor teeth, as well as the peculiar projections of the jaws which resulted from the various forms of tongue and hand sucking, were evidences that the individual had been exposed, when a child, to the prejudicial influences of fruitless sucking, and that the various degrees of weakness and delicacy usually exhibited by such persons were not the result of any hereditary disease transmitted by the parents, but an acquired state, the consequence of having been exposed to the evils in question. The defective children styled idiots exhibited the evils in their maximum intensity. In some families all had suffered, and equally bore the evidences; in others, some only had been victims, and in such cases they might see one or more strong children with normal teeth and jaws among several delicate ones with their teeth and jaws defective and deformed. So that really, and this was a matter of vast importance in a social point of view, it did not follow that a weak parent of either sex should beget weak progeny, nor that strong parents should necessarily rear vigorous children. So far as he had seen, children came into the world with the elements of natural growth, and this proceeded perfectly if they were exposed to favorable conditions. He had seen the finest of new-born children speedily become as a skeleton, and on the other hand, the smallest grow large and strong almost as rapidly. He concluded by directing attention to the models which illustrated what he had advanced, and to various forms of sucking apparatus placed on the table.

"Mr. HARRISON.—The main object I had in putting the question which I did last month, was to ascertain what the *constitutional* effects of this habit were in the adult, irrespective of its mechanical effects upon the jaws; and probably Dr. Ballard has not answered this question more fully, because he did not exactly understand me. I will not enter upon a discussion of the mechanical changes produced upon the jaws by this habit now, sir, because I think they will be best discussed when we come to consider Mr. Cartwright's excellent paper; but will return again for a short time to the subject of fruitless sucking in infants. Dr. Ballard states, as a fact, that it has its origin in the child being put to the breast when there is not milk for it, or in its being fed from badly arranged feeding-bottles, or from its having sugar-teats given it to suck, to keep it quiet. Now all these causes must necessarily give rise to fruitless sucking, for the time being; but I think it is a question whether they all

necessarily establish a *habit* of fruitless sucking. Why, I would ask, should a child put to the breast before the milk is secreted—which may be several times for the first sixty hours of its life—afterward *continue* to exercise this habit, when, as under ordinary circumstances, the breast becomes supplied with milk, and the child, it is to be presumed, is properly fed? I think, so far as any proof to the contrary appears from the paper which he has read, that it is a mere assumption (I do not mean to use the word at all offensively) to state that, because a child is put to the breast before there is sufficient milk for it to be nourished with, or because it is fed from those bottles from which it does not get its food readily, it necessarily gets the habit of fruitless sucking, which habit it continues for years. When we look to the number of infants put to the breast, and fed in this way, and consider how few, comparatively, have this as a retained habit, I think we must regard it as one having its origin in other causes than the two first, at any rate, to which Dr. Ballard has ascribed it; although I quite agree with him that the practice of giving infants, or children, sugar-teats to suck, to get them to sleep, is very likely to produce this habit, by inducing them to suck their fingers or thumbs when deprived of their teats, and is therefore a very objectionable one.

“MR. VASEY.—With respect to Dr. Ballard’s paper, I am also of the opinion, so well expressed by Mr. Harrison, that there is a very great deal of truth and benefit to be derived from the idea, but I really think he carries it too far. In a model passed round to-night, as exhibiting a case of this fruitless sucking, you see the canine tooth has come down posteriorly to the temporary canine; and it seems to me one of those natural deformities that we get, not only in the human subject, but in the lower animals, and from the lower animals we may go to plants, and find defects and irregularities. He also refers to this habit as bringing about honey-combed teeth. One of those cases I exhibited at the Pathological Society was an extreme one. A lady came to me to have some artificial teeth, and from the state of the mouth, I put the question to her, whether she was in the habit of sucking her finger? She admitted that she had been; she was forty years of age, and had done so up to that time. But more perfect enamel teeth than hers were not often seen. It was a case of very great protrusion, but the structure of the teeth was very perfect indeed. In cases of protrusion I have always made a great distinction between those where we seem to have an undue development of the lower teeth. There are some cases in which the lower incisor teeth seem to be developed to a disproportionate extent, and in many of these I can find no history whatever of thumb or finger sucking.

“DR. RICHARDSON.—The subject Dr. Ballard has brought before the meeting to-night he was so good as to ask me to pay attention to now nearly two years ago. Previously to that time I had been in the same ignorance as the rest of my profession as to the importance of this apparently simple act of sucking in infancy; and I am ashamed to say, and I say it with the greatest possible candor, I was rather inclined, when Dr. Ballard’s efforts were first made known, to look upon them as something rather too small to be considered of any great moment, and, indeed, as crochety rather than as real. However, since Dr. Ballard brought the matter before me, I have looked into the question very closely, and I am bound to say that, in a vast number of particulars, I entirely agree with him, and attach to what he has pointed out an immense amount of in-

terest. In the first place, I have been looking at mouths in the worst forms of disease and deformity I could meet with, at an institution where cases of deformity are not unfrequent; and I think, after observing a large number of cases and looking at them carefully, I may distinctly say that, with very few exceptions, in the cases that have occurred, and in which there has been great protrusion of the mouth, the distinctest evidence has been given of this sucking; and, on pressing the parents or attendants of the child for explanation, they have often already come to the conclusion that this sucking process had caused the mischief. In the better classes of society, in ladies of good position, we find the deformed mouth, and when we learn their history, we discover that they have been, and perhaps at the time are, in the habit of sucking their thumbs or some part of the hand or fingers, the thumb being the most common. So far I can go with Dr. Ballard, that these deformities of the mouth are in the main connected with the sucking process. But we do now and then meet with cases of scrofula and of phthisis—I am not going to speak positively as to cause and effect—where there is an abnormal condition of the jaw, not depending upon sucking, and not confined to the jaw; where, for instance, we have, with the projecting frontal angle of the jaw a projecting sternum, and in the female especially, a projecting pelvis—the pubis being brought out exceedingly sharp, and the pelvis, in fact, being like a triangle instead of being oval or almost round. That state I have seen constantly as connected with a peculiar build of body altogether; and I think we may isolate this class of cases from the majority of cases to which Dr. Ballard has drawn attention. Dr. Ballard, perhaps, will retort and say that the deformities of the chest (what are called the pigeon chest) and the sharp pelvis—which so largely interferes, by the way, in the woman, with natural childbirth,—that these two changes are effects dependent on the change that originally is produced in the jaw; that, in fact, the sucking process has so modified the mouth and so modified the digestion, and produced such an effect on the nutrition, that the chest has not been properly built up, that the bones have become rickety, and that under the atmospheric pressure, and under the action of the muscular system, particularly of the pectoral muscles in the case of the chest, the abnormal form is induced by the one cause to which he has drawn attention. We have not sufficient evidence, either on the one side or the other, to say whether Dr. Ballard is right or not; but I do think that there is a class of rare cases, where this condition of sucking does not precede, and where the child is born probably of the build by, or on, which he has grown up and become developed. So far with regard to those states which refer simply to shape. Now, as regards the after-statement of Dr. Ballard; I mean as to the condition of the stomach in cases where the child sucks fruitlessly. I think here I could also go with him to a very considerable extent. I have no doubt, for I have seen the fact over and over again, that a child, during the act of fruitless sucking, has lain down to sleep, and has awaked with violent pain in the stomach, with eructations, with belchings of wind, and with all the conditions which we would call acute dyspepsia in the grown-up person; and I think I have seen many times that this acute attack has been produced by the sucking, and that it has been relieved by the after practice of taking away the cause. So far then these symptoms establish the truth of Dr. Ballard's theory; and it is true, as Dr. Ballard has stated, that continued fruitless sucking does unquestionably produce acute dyspepsia in the child.

"Mr. CARTWRIGHT.—Dr. Ballard is inclined to think that the mechanical action or pressure of the thumb, acting as a wedge, is the cause of *all* the deformities which we see in children's jaws. From such an inference I beg to differ. I think there is an hereditary and congenital form of abnormal jaws; for in every other part of the body we find forms and peculiarities transmitted from parent to child. This occurs so frequently that I cannot conceive why it should be different with regard to the mouth. I think all of us must have seen certain characteristics in a child, so marked in one or both parents, that it would be absurd to deny that hereditary transmission has to do with certain formations of the jaws. I mentioned a case in my paper where a child, under treatment at the time, presented the same form and character of jaws that was exhibited in both the parents—both parents having that prominent or projecting form of the upper jaw, one having a contracted arch, and the other having a fairly formed arch with good teeth. The father of the child happens to have been with me to-day, and I made it a particular point to investigate very thoroughly whether there had been any thumb-sucking in the case. Now, with regard to the other children in the family, he said he wished to bring them because they all exhibited a tendency to the condition that child exhibited. I inquired whether those children sucked their thumbs or fingers. He said: 'They do, we can't prevent it; but this girl never sucked her thumb in her life.' As far as regards the appearance of this child, she was most healthy-looking, and particularly forward and intelligent, and there was no indication of any ailment at all. Every tooth was perfect as to anatomical proportion and structural conformation. Here, then, was a form of the jaw, the counterpart of the mother's, and in some phases very much resembling the father's. * * * Then, with regard to the point to which Dr. Ballard refers—the abnormal action in the formative tissues of the teeth arising from irritation connected with thumb-sucking—my experience is, that in most of these prominently developed jaws the teeth are usually perfect. It is under very different circumstances that the imperfect or pitted conditions of teeth are found; therefore I do not think the mere irritation connected with thumb-sucking has anything to do with the abnormal development of the teeth. * * *

"Dr. BALLARD.—I particularly wish it to be understood that it is not to thumb-sucking that I attribute the serration of the incisor teeth. The principal evil I attribute to thumb-sucking is the protrusion of the jaw. That I distinctly state here; and whenever I have spoken upon the subject before, I have always pointed out thumb-sucking as only one of the *retained habits* of sucking; that is to say, it is one of the evidences of the child having been exposed to the more serious evils in infancy, and doubtless, in a modified degree, perpetuates the evil. With regard to the serration of the incisors, it is debatable ground I know; and I am very glad to have thrown out on it the hint I did to this Society. I state it as my opinion resulting from my observations. I hope, in a few years, I shall have stronger evidence in favor of it. I expect to see that those children whom I have brought up without fruitless sucking will have their permanent incisors free from serration. At present, I see that those who have been exposed to some forms of the evil have the serrations; that is to say, those who have been exposed to the sucking of these bottles with calves' teats, wash leather, &c., and not to thumb-sucking. I am especially anxious that should be understood."

PHILADELPHIA SCHOOL OF ANATOMY AND OPERATIVE SURGERY.—The announcement of the eighty-fifth session of this old-established institution, now nearly half a century in successful operation, has been received. The regular winter course will commence on the tenth of October, and continue until the first of March. The lectures of Dr. James E. Garretson, which have given entire satisfaction to the large classes which have attended his previous courses, embrace the full subject of human anatomy, descriptive and surgical. The dissecting rooms are fitted up in the most perfect manner, and a constant supply of material is always on hand, so that every opportunity is afforded for acquiring a thorough and practical knowledge of anatomy in this institution. This institution commends itself to dental as well as medical students.

LIEUTENANT-GENERAL U. S. GRANT.—The accompanying extract, from a brief biography of the Commander of the Federal armies, will be read with interest, not only on account of the Spartan simplicity manifested by this great warrior in his habits, diet, etc., but also on account of the care which he evidently bestows on his teeth, for while laying aside his luggage, and all other articles of toilet as incumbrances, he yet retains his tooth-brush as indispensable. He evidently recognizes that easy digestion is of the first importance in insuring the possession of a *clear mind*; and to secure this, that the food must be properly masticated, and the organs which effect that desirable result should receive due attention under all circumstances. At the period referred to below, he was engaged for a succession of days in a series of battles which will rank on the page of history as among the most brilliant and important in their results, either of ancient or modern times.

“A gentleman who participated in the Vicksburg campaign of General Grant, up to the time the enemy crossed the Big Black in the retreat toward Vicksburg, states that ‘in starting on the movement the General disencumbered himself of everything, setting an example to his officers and men. He took neither a horse nor a servant, overcoat nor blanket, nor tent nor camp-chest, nor even a clean shirt. *His only baggage consisted of a tooth-brush.* He always showed his teeth to the Rebels. *He shared all the hardships of the private soldier, sleeping in the front and in the open air, and eating hard tack and salt pork.* He wore no sword, had on a low-crowned citizen’s hat, and the only thing about him to mark him as a military man was his two stars on his undress military coat. On the battle-field he was omnipresent, riding everywhere, generally alone, into the very thickest of the fight, inspiring the troops by his imperturbable coolness and bravery.’”

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"On the Action of Anæsthetics, and the Administration of Chloroform."
By ARTHUR ERNEST SANSON, M.D.—The early notions as to the action of the volatile anæsthetics—and these are now the generally received ideas—were that they exerted a primary action upon the brain and nervous system. In virtue of a particular elective affinity, they stored themselves up in the cerebro-spinal centres, and exercised a sort of stupefying action thereupon. Lallemand, Perrin, and Duroy having found after death from inhalation of anæsthetics a larger proportion of each anæsthetic employed, in the nerve matter than in any other part of the organism, argued (1) that they accumulate in nerve substance by virtue of an affinity of election, and (2) that thus, and thus only, are they capable of abrogating the functions of the nervous system. And now it is the general habit to speak of these bodies as having an active influence on the brain, and to consider them as special nerve poisons.

"A primary difficulty has been advanced to this theory by MM. Faure and Gosselin, whose experiments tend to show that chloroform applied to, or circulating in, the brain merely as chloroform, fails to produce anæsthesia. Therefore to some this paradox of elective affinity has been the occasion of a deeper investigation, and these combined labors point to a more universal cause for the phenomena of etherization. The element of the organism to which these observers refer the first action of anæsthetics is the blood.

"When chloroform or ether is inhaled it may do one of two things: it may be absorbed and projected throughout the body, manifesting its presence by its direct action on the nervous system, or it may act upon the blood, modifying its vitalization. And when we consider the vast vascular area to which, in the progress of inhalation, the anæsthetic is applied, it is not difficult to appreciate the influence exerted on the phenomena of aeration of the blood.

"It is not doubted that there are certain gaseous bodies capable of thus influencing hæmatosis, the action of which is precisely analogous to that of the other anæsthetic agents. Carbonic acid and carbonic oxide produce an exactly similar train of symptoms to those induced by ether or chloroform, and that these act by an influence on hæmatosis is undeniable. One is led to ask, wherein is the difference of action between chloroform and these? MM. Lallemand, Perrin, and Duroy separate them widely, because they find the liquid vaporizable anæsthetics in greater quantity in the brain after death than in other parts of the body. This evidence is but little worth when we consider how admirably the brain is adapted, from its soft structure and free supply of blood, to allow exosmosis and the storing up of fluid in its substance. And the theory is rendered still more incredible when we ask, how is it that in chloroform narcosis the effects pass off with so much rapidity, with a facility quite disproportionate to that of eliminating a quantity of fluid impregnating the brain?

"Both analogy and observation show that the phenomena of narcosis are due, not to the influence of a circulating poison, but to the influence

of an altered blood. Given, then, that chloroform, ether, etc. act by suspending oxygenation, how do they effect that suspension? Obviously either by acting upon the blood itself or upon the structures through which oxygen passes into the blood.

"M. Faure adopted the view that an ecchymosis of the lungs occurred, and impeded the entrance of air. The abundant proofs, however, of the absorption of chloroform and the production of anæsthesia when injected under the skin or into the peritoneal cavity—the commonly-observed fact that after death from chloroform the lungs are not congested, but pallid, and the consideration of how much then ecchymoses, if they occurred, would compromise life—are sufficient to invalidate the theory. The fact is, therefore, that chloroform directly influences the fluid blood. It has the property of diminishing the tendency of the organic constituents of the blood to unite with oxygen.

"Dr. Jackson, of Boston has recorded a case in which he found the whole of the chloroform to have changed by oxidation to formic acid—it had robbed the blood of its oxygen. On the other hand, there have been many cases in which the chloroform has been recovered unchanged.

"What is the exact nature of the action is difficult to say, but the author considered it probable that the cell-wall of the blood corpuscle was so affected as to impede the entrance of oxygen.

"The first effect in narcosis is increase in frequency and force of the heart pulsations, a subsequent effect is decrease of both; the increase is due to heart stimulation, and to disturbance of the molecular change in the brain; the decrease, to the more exalted brain disturbance, and the loaded state of the capillary system.

"The author gave the results of a number of experiments upon the effects of anæsthetics on the circulation as seen in the web of a frog's foot under the microscope. In these experiments he had received the valuable assistance of Dr. John Harley, of King's College. The conclusions were these:—

"(1.) In the case of all the anæsthetics employed—carbonic acid, ether, alcohol, and chloroform—there is an increase in the flow of blood in the whole vascular system.

"(2.) There is, next, decided contraction of the arteries, the current maintaining its original force. Contraction may persist throughout perfect anæsthesia, and dilatation of the artery is evidence only of too profound an action.

"(3.) Sluggishness of the capillary circulation is observed. Sometimes the corpuscles agglomerate. They toil along in an irregular current.

"(4.) Dilatation of the artery; increasing sluggishness of circulation; stasis.

"These stages are constant in the case of the other anæsthetics; in chloroform they vary with the strength of the vapor. If the vapor be strong, the stop of contraction is of very short duration; frequently dilatation rapidly supervenes, and there is great embarrassment of the capillary circulation.

"Failure of the circulation is the cardinal sign of danger in chloroform administration. In nearly all of the cases of death from chloroform, pallor of the face and failure of the pulse were the first signs of danger.

"The manner of death from chloroform varies. It varies in experiments according to the nature of the animal, and that directly in proportion to the independent contractile power of the heart. The heart of the higher

animals soon succumbs to the power of chloroform, but yet it always outlives respiration. The heart of the lower animals continues to contract, and resists the most profound action. In man the heart, possessing but little automatic power, yields first; in children, however, the heart has less dependence on the central nervous system, and hence their immunity from chloroform-syncope.

“Reviewing the signs and symptoms of induced anæsthesia, the following considerations have their weight in reference to the proper modes of administering chloroform:—

“In all cases of experiment upon animals the symptoms of narcosis are induced in the most regular, uniform, and safe manner when freely-diluted vapor has been administered. Highly charged atmospheres always cause great trouble of the capillary circulation, but dilute atmospheres allow, as it were, the gradual accommodation of the system to the new state. When, after some time, a weak atmosphere has been breathed, a strong dose has been administered, there is far less irregularity than as if the concentrated atmosphere had been breathed at the first. The dangers of a strong dose are obvious in our experience with respect to the human subject, and we know that one containing 6 per cent. of chloroform is fatal to animals. Everything shows us that when we deal with chloroform we deal with a dangerous drug, and it is incumbent on us to use the utmost caution.

“The author strongly urged that mechanical means for insuring the due dilution of chloroform vapor should be employed, and that the question should not be considered one of convenience only. In giving chloroform upon a handkerchief or upon folded lint, you have no knowledge whatever of the strength of the atmosphere inhaled. Assurances of personal confidence in the anæsthetic are of little use. People who boast that they have given it two thousand times and have never had a fatal case, should know that only the probable proportion of deaths to inhalations is one to twenty thousand. And this is far too much. Chloroform ought, in the nature of things, to be rendered absolutely safe.

“Two methods present themselves as void of danger. One provides the inhalation of a definitely weak atmosphere, that never rises above $3\frac{1}{2}$ per cent. This is only attainable with absolute certainty by Mr. Clover's method—the proportions of chloroform vapor with atmospheric air being commingled beforehand, and kept in an India-rubber reservoir.

“A second plan commences with a very slight proportion of chloroform—an almost inappreciable quantity—and provides a gradual increase in the proportion of chloroform inhaled. All analogy shows that to a certain extent tolerance of chloroform can be induced just as tolerance of vitiated air can be. The dangers of chloroform narcotism are not in a direct ratio with the quantity of chloroform absorbed, for it is a fact that most of the deaths have occurred in cases where anæsthesia has been incompletely established, and the quantity of chloroform inhaled has been small. There has been an intolerance—a repudiation—of the vapor at the first.

“Coughing and struggling, and voluntary withdrawal from the chloroform-besprinkled surface, are signs of this intolerance; but when chloroform is given in an absolutely progressive manner, these signs never occur.

“The instrument which the author uses admits two direct currents of air besides the current admitted by the aperture of Sibson's face-piece.

These currents are gradually cut off by the mere revolution of one tube upon another. An atmosphere of any concentration up to 5 per cent. can thus be breathed.

"The author hoped that soon medical practitioners would no more allow their patients to inhale the uncertain atmosphere given off from a folded handkerchief, than they would permit them to take unlimited draughts of a solution of morphia.

"Dr. Richardson described that the action of all anæsthetics and all narcotics was the same in principle; they, one and all, by their presence prevented the combination of oxygen with oxidized matters, and they, one and all, prevented combustion. They acted in the same manner out of the body, and the whole of the phenomena of anæsthesia could, as Snow had said, be demonstrated on a 'farthing candle.' This discovery of the action of anæsthetics was due *exclusively* to the late Dr. Snow, who had brought it to such perfection of proof that more could scarcely be added to it. Chloroform, therefore, acted generally through the blood; it checked all chemical combination, and it checked the development of force; it produced, in plain words, a temporary death, from which the patient recovered only by virtue of the fact that the narcotic being volatile, it could, under careful manipulation, be given until the patient had reached near enough to death to be operated on without sensation, and the vapor being withdrawn, could recover by a process of gradual evolution of the narcotic. It was not that oxygen acted on a particular part of the blood, as Dr. Sansom had suggested, not that it acted on the blood corpuscles only, but that it produced a general action which suppressed oxidation. The process was most simple, and it not only resembled the process of insensibility brought about by carbonic acid and other negative poisons, but also the insensibility that follows from extreme cold locally or generally applied. After showing that all anæsthetics were likewise antiseptics, Dr. Richardson said that as in anæsthesia from chloroform the body was brought as near as was just safe toward inertia or death, it followed that the dangers incident to the process were greater or lesser according to the health of every important organ and the unity of function that prevailed."—(*Med. Times and Gaz.*)

"*On Neuralgia.* By EDWARD WOAKES, M.D.—One main point in this paper, read before the British Medical Association, was an attempt to arrive at the pathological condition of neuralgic affections following injuries in the neighborhood of the nerve subsequently affected by neuralgia. These were distinguished from neuritis, or simple inflammation of the nerve, and were found, from some six or eight cases adduced in illustration, to occur in persons of a rheumatic diathesis. The argument was then stated. For the repair of the injury the parts become inflamed, in which process the part which mainly concerns the theory broached is the surcharged condition of the vasi nervorum, and the fact of the injured nerve being bathed in the fluid portions of the blood, having in solution the materies morbi of rheumatism. The nerve is thus brought into more intimate connection with the vitiated fluid of the entire system, and the irritation so induced is inferred to occasion the symptoms usually designated as rheumatic neuralgia. The chronic nature of these cases was found to support the argument, for the poison of the system having obtained a convenient site whereon to exhaust itself, continues the habit of doing so long after the immediate effects of the accident which primarily determined it to the

spot have ceased. That a vicious habit of the physical system is readily established as it is in the moral system, is borne out by the repeated irruption of a constitutional taint in the form of a skin-rash in a definite spot of integument. But whether the explanation hold good or not, it is quite certain that in many of these instances the most persevering application of local remedies is entirely nugatory as regards the relief of the patient, while this object is at once accomplished so soon as the constitutional taint is attacked.

"Two other cases were adduced in further support of the theory. In one, neuralgia of the brachial nerves was due to impregnation of the system with alcohol, and occurred in conjunction with delirium tremens. In another a most acute attack of *tic-doloureux* was traced directly to marsh poison. Both were cured by attacking the peculiar blood taint. Now, as a state of the brain in ordinary delirium tremens is confessedly not one of inflammation, and as the cause of the brachial pain was undoubtedly the same as that of the head symptoms, neither was this latter inflammatory, but was due simply to the irritation of the alcohol present in the blood. The conclusion derived from the three sets of cases may be thus stated: The morbid condition of the nervous system produced by alcohol when it occasions neuralgia is the same, *mutatis mutandis*, where the materies morbi of rheumatism is concerned. The same also of the paludal infection; and in short with any other blood poison. And as this has been shown to be not inflammatory in the one case, neither is it in any of the others."—(*Ibid.*)

Pathology.—In the course of an able address on Surgery (*Ibid.*), PROF. HUMPHRY offers the following judicious observations upon this subject: "And to the science of Surgery, I need scarcely say that pathology, in all its branches, is the very corner-stone. It is only by a close observation of the manifestations of disease that we can hope to obtain an insight into its real nature. In this work, the microscope is doing vast service, opening up new regions of observation and thought, and teaching us more and more of the close connection between pathology and physiology—a connection first fully recognized by Hunter. Through the revelations of the microscope, we are seeing, more and more clearly, that disease is not a thing foreign, or additional, to the body, so much as an evolution from it; in other words, that it does not consist in new processes, but rather in modifications of the old or natural processes; and, therefore, that the parasitic theory—the theory of the insertion, incubation, and proliferation of oxogenous germs—is becoming less and less generally applicable. We learn that inflammation, and many other morbid processes, consist in a *plus* or *minus*, with slight variation, of the ordinary circulatory and nutritive processes. We are coming to more sure conclusions, through the researches of Virchow and others, that the pus-cell is but a variation of the areolar or epithelial cytoblast. Moreover, careful observation of the components of cysts and tumors, even of those most destructive in their effects, and apparently most foreign to the ordinary structures, brings out such close resemblance to the natural elements of the body, in their intimate composition and mode of growth, as to confirm the view propounded some years ago by myself, and, probably, by others, that they are not new growths, or additions, but merely outgrowths, or hypertrophies, with more or less modification, of the natural tissues; in short, that there are no new structures produced in the organism by dis-

ease. In the words of a recent writer, 'heterologous tissues have physiological types; and there is no other kind of heterology in morbid structures than the abnormal manner in which they arise as to place, time, and quantity.'

"If this be so, it almost follows that disease spreads, not by the propagation and dissemination of germs, but by impressing upon the nutritive processes and adjacent tissues, or in other parts of the body, of a tendency to like variation with its own; that is to say, by assimilation or fermentation, rather than by germination. Thus, inflammation spreads, like excitement in a mob, by the extension of the disorder from cell to cell and from vessel to vessel; and suppuration at one part may, especially in particular states of the system, induce suppuration at other parts. Thus, cancer grows by moulding the adjacent growing elements into its likeness; while the cause which first engendered it, the constitutional predisposition, or whatever it may be, facilitates this influence over the immediate circumference of the disease. The communication of a disorder by inoculation is analogous to the effect produced by a ferment; and that by contagion resembles the influence exerted by a decomposing mass in a larder.

"But I must not stray into these pleasant paths of theory. Not, as I have before said, that they are without their practical import; and I am sometimes tempted to think that the view of disease just taken does seem to shed a dim, distant glimmer of hope upon that black and desperate disease which is the most grievous curse of our species and the saddest opprobrium of our science, the great emblem, and may we not say also, a great agent of evil. If cancer, after all, be the result of a modification of the ordinary processes of nutrition, may we not indulge a hope²⁴ that, when those processes and that modification are better understood, some mode of control may be found, some means discovered, of arresting the disorder and of restoring health? When helplessly watching the sinking frame racked with this horrible malady, one feels that the remotest prospect of finding a remedy, or even of clearing the way to that knowledge of the malady which may lead to a remedy, is stimulus enough to urge on the pathologist through years of patient work."

Syphilis.—In relation to the direful constitutional and hereditary effects of this malignant malady, the same author, in conclusion, pertinently observes (*Ibid.*) "One's anxiety to quench at once, and as early as possible, the first spark of the disease, has, of late, been greatly heightened, in consequence of the disclosures, by Mr. Hutchinson, Dr. Wilks, and others, of its persistent vitality, smouldering on from generation to generation, interfering with development and nutrition, imprinting its tell-tale marks upon the teeth, the nose, and other parts, exciting or modifying disease in the organs of sense, the skin, and most of the internal organs, and bursting out, in the original sufferer or his descendants, in a variety of ways, and at protracted periods. These impress upon us more strongly than ever the conviction that the combined influences of Law, Physic, and Divinity are urgently needed to arrest the evil, and to prevent its deteriorating influence upon our race."

"Interstitial Keratitis of Hereditary Syphilis without the Single Notch of the Incisors.—Although in Mr. Furneaux Jordan's practice at the Birmingham Eye and Ear Hospital the great bulk of the cases of interstitial keratitis are associated with the peculiar teeth described by

Mr. Jonathan Hutchinson, cases do occasionally occur where the interstitial keratitis is present with undoubted indications of inherited syphilis, especially nodes on the ulna, but where the teeth are perfectly healthy, a mild mercurial treatment in these cases works most useful results.”—(*Ibid.*)

“*Exudations.*—In the *Quarterly Journal of Microscopical Science* for April, Dr. Beale promulgates some ‘new views with regard to exudations.’ Differing from those pathologists who believe that a clear transparent plasma may give rise to the formation of living cells, as well as from those who dogmatically lay it down that every cell comes from a pre-existing cell, Dr. Beale holds that there are living bodies which are not cells, and yet which grow and multiply, and that many of the clear fluids which are considered as ‘*exudations*’ from the blood really contain a multitude of extremely minute particles of living matter, which are intimately related to the white blood corpuscles, and that these grow and become one source of the small granular cells or corpuscles which are so familiar to all who have studied morbid changes in the tissues. Some of these may be so small as to be invisible by a power magnifying 5000 diameters. Such living or germinal matter, he holds, may retain its vitality even when detached from the body, germinating again when placed under favorable conditions. In this way he explains the propagation of purulent ophthalmia, and suggests that small masses of germinal matter are really the agents which are directly concerned in the introduction and distribution of the so-called animal poisons. He adduces the analogy of living vegetable organisms which are only just visible by a power of 5000 linear. ‘Pus corpuscles and ordinary lymph corpuscles are too large to be carried through the air, but minute particles may be detached from any of these bodies not larger than the germs of fungi which we know to exist in the atmosphere, and are thus transferred from one place to another. No doubt the great majority of such minute particles of living matter in a peculiarly active state of vitality would die long before they reached a new locality favorable to their propagation, but a few might escape, and meeting with a favorable surface would germinate. Warmth, moist air, little change in the atmosphere, are conditions under which the life of such minute particles of living matter would probably be preserved, and which are the conditions favorable to the propagation and spread of many of those contagious diseases which have long been attributed to the transference of matter which acts like ferments.’”—(*Ibid.*)

“*Origin of Stellate Cells and Vessels from Germinal Matter.*—In the development of blood-vessels, the general opinion is that cells become stellate, and that the processes formed by contiguous cells meet together, and thus, it is conceived, the cavities of the adjacent cells become connected together by tubes. I have contested this inference, and have endeavored to show that, so far from any coalescence between cells occurring, the communicating tubes, in all cases, result from the separation or moving away from each other of ‘cells’ which were originally continuous. Supposing a mass of germinal matter, with a slightly hardened layer of formed material or cell-wall on the surface, to exhibit a tendency to division;—as the two portions separate farther and farther from each other, while at the same time they still continue to grow, a narrow communicating tube is

formed. The walls of this tube clearly correspond to the so-called 'cell-wall,' while its cavity contains germinal matter, just as I have shown that the prolongations of young connective-tissue corpuscles contain germinal matter, which extends from the central mass—(nucleus.) Now, in the formation of capillary vessels, a portion of this germinal matter, which is derived from the germinal matter of the original cell, in all probability gives rise to white blood-corpuscles."—(PROF. BEALE, *Quar. Journ. Micro. Sci.*)

"Development of Capillaries and White Blood-corpuscles in the 'Periosteum' of a Tooth.—In the periosteum of the fang of the tooth, in an inflamed state, the changes occurring during the development of capillaries may be studied in the adult; the firmness of the tissue renders it possible to cut exceedingly thin sections for the microscope, which may be examined with the highest powers, and investigated with precision."—(PROF. BEALE, *Ibid.*)

Molecular Assimilation of Coloring Matter.—In a report on the Microscopical department of the late International Exhibition of England, (*Ibid.*), MR. C. BROOKES states that "Prof. Beale exhibited some very beautiful preparations, illustrative of a fact discovered by himself, which has a very important physiological bearing—namely, that if small portions of tissue are, immediately after the extinction of life, immersed in an alkaline solution of carmine, those elements in which growth or development was actually in progress at a time immediately preceding the cessation of vitality, become permanently stained by the coloring matter; while from the 'formed material,' as he terms it, comprising those portions of tissue in which the development is complete, the color may be subsequently washed out. This evidently affords a most important means of investigating the processes concerned in the growth and development of the various tissues of which animal frame is composed. Some preparations were also exhibited illustrating the preservative effect of a weak aqueous solution of wood-naphtha and creosote."

Albumen converted into Fibrin.—"A paper by MR. ALFRED SUREE, JR., recently read before the Royal Society, appears, so far as can be judged at present, to have a bearing on physiological chemistry. In few words, the facts may be thus stated: Pass a stream of oxygen through a quantity of albumen, and portions of that albumen will be converted into fibrin. The albumen may be derived from the serum of blood, from eggs, or from the gluten of wheat; the result is the same,—formation of fibrin. Taking the facts for granted, this is a very remarkable discovery; and it is thought that it may throw some light on the phenomena of fibrinous diseases,—phthisis, peritonitis, and the like,—which are obscure in their origin. If a small quantity of potash be mixed with the albumen, there is then no formation of fibrin."—(*Annual of Scientific Discovery.*)

Chloride of Sodium as an Organic Constituent.—"PROFESSOR DALTON, in his standard work on physiology, states that common salt—the chloride of sodium—is found in the bones, muscles, tendons, nerves, hair, and nails, in the saliva, gastric juice, and blood, in all the fluids and in all the solids of the human system, with the single exception of the enamel of the teeth, where it has not yet been detected."—(*Sci. Amer.*)

Nerves of Glands.—"According to KRAUSE, there are various glands possessing ducts which only furnish an abundant supply of their secretion when certain nerves are stimulated; such are the salivary and lachrymal glands, which not only resemble one another in all the particulars of their general structure, but also agree in the remarkable point that their nerves are derived from two sources. Those which act directly on the salivary glands run in the third division of the fifth pair—that is to say, in the chorda tympani, and receive at various places communicating branches from the sympathetic ganglia or plexuses. Those intended for the lachrymal glands proceed from the ganglion ciliare. In both sets of glands plexuses may be seen, consisting of the pale fibres of Remak accompanying the arteries even to their smallest branches. With these are some fine nerves possessing a double contour and probably sensory properties. The larger trunks of those nerves that act directly on the gland are usually found forming wide-meshed plexus, in close proximity with the ducts of the gland. The ducts are usually composed of loose connective tissue with longitudinally or transversely arranged elastic tissue, in greater or less abundance. Smooth muscular tissue is rarely or never discoverable in man, except in Wharton's duct, in which all recent observers have noticed its presence. Hence it would appear that agents or stimuli leading to the increased discharge of secretion act, not on the ducts of the glands, but on the ultimate secreting vesicles of the gland itself. In the dog and hedgehog, while the nerves are yet lying on the ducts of the salivary glands, before reaching the glandular substance, ganglion cells are now and then distributed among the fibres. In the gland substance the nerves divide and anastomose, and the number of ganglion cells is very great. On the chief duct, or on its first branches, a large ganglion is often to be found, the cells of which amounting to several hundreds are connected on either side with fibres, two or three cells often intervening between an inferent and an efferent fibre. Numerous smaller ganglia of fusiform or spherical shape are scattered through the substance of the gland, making these structures among the most richly supplied with nerves of all in the body. Krause reserves the description of the mode of termination of these nerves for another communication."—(*Brit. and For. Med.-Chir. Review and Dublin Med. Press.*)

Saliva, etc.—In a notice of DR. DALTON's Treatise on Physiology, (*Med. and Surg. Reporter*,) it is stated that "in relation to the method of obtaining the secretion from the parotid gland, we observe that, instead of resorting to a salivary fistula as is usually done in obtaining this fluid, it is procured in a state of purity under healthy conditions by introducing a silver canula directly into the orifice of Steno's duct. Thus obtained, the secretion has been subjected to a quantitative analysis, by Dr. Maurice Perkins, who found, with the author, a decidedly larger percentage of solid matters than obtained by Frerichs and Jacobowitsch. He also found that fresh parotid saliva, when treated with perchloride of iron, showed no evidences of sulpho-cyanogen, and it was only to be detected after the organic matter had been precipitated by alcohol and the filtered fluid examined. In this respect, he concludes that the organic matter bears some resemblance to albumen, without, however, being identical with that substance.

"In the chapter upon the biliary secretion, the immediate and remote effects of permanent biliary fistula are discussed, and we are pleased to see

embodied also the valuable observations of Prof. Austin Flint, Jr., on Stercorine, Cholesterine, and their supposed ultimate products. The interest of the section devoted to development is considerably enhanced by the addition of new matter more or less useful toward elucidation of this important problem. He refers to the case observed by Prof. Jeffries Wyman, where the intermaxillary bones were not united with each other, but entirely separate, corresponding in this respect with the intermaxillary bones of the inferior orders of animals."

Staphylorrhaphy.—"In the operations for fissure of the palate, as our readers will have noticed in Prof. Fergusson's lectures, Dr. Warren has introduced some very important innovations which have contributed largely to their success. These operations, he says, he has now done about ninety times, and, with the exception of half a dozen cases, has never failed to get more or less union of the soft parts; and it is a remarkable fact that, in the most extreme cases of very wide fissure, the operation has been as successful in improving the voice as in cases of the simplest character confined to the soft palate only. The most essential point is, I am sure, to establish the vellum throughout the greatest possible extent; and just in proportion as this end is attained will be the degree of perfection with which articulation will be finally performed.'"—(*Bost. Med. and Surg. Journ.*)

Absence of Tongue.—"DR. BANON detailed to the Association of the College of Physicians a remarkable case, and exhibited a specimen in which the tongue was absent for the greater portion of the patient's life. The patient came under his notice in the month of June last year, having been committed to the Richmond Prison as a vagrant on the first of that month, and dying eight days subsequently in the prison hospital of bronchitis. He was upwards of sixty years of age, and stated that generally his health had been good. Dr. Banon, on first seeing him, was struck with his very defective articulation, and still more so by his inability to protrude his tongue on being asked to do so, and the total absence of that organ, which a closer examination revealed. On opening the mouth, nothing resembling a tongue could be either felt or seen. [Dr. Banon exhibited the lower jaw, palate, pharynx, and larynx.] The interior of the mouth presents a perfectly smooth surface, not even a projection indicating the former site of the tongue, covered with mucous membrane, and becoming firmer as the finger approached the front of the epiglottis. Beneath the mucous membrane are a few muscular fibres, with abundant cellular tissue. The epiglottis, larynx, and pharynx, and in fact all the surrounding organs, appear to be perfectly normal. The history the individual gave of his case was that, when a child, he was attacked with ulceration of the tongue, which he attributed to a habit of placing copper coins and buttons in his mouth. The ulceration continuing, and his articulation becoming affected, he applied to some of the hospitals, but without any relief. The tongue gradually disappeared, and his articulation became so bad that he could not make himself understood; but after the lapse of some years it improved so much that, with the exception of not being able to pronounce some words, he suffered but little inconvenience. His deglutition was never seriously affected. He (Dr. Banon) was at a loss to fix on the exact nature of the disease which resulted in the destruction of the tongue in this case. That it was not syphilitic

ulceration, may be inferred from the early age at which the patient was attacked, and his subsequent excellent health. Whether the disease was atrophy or ulceration, or could have resulted, as the patient thought, from the contact of the copper coins, were questions worthy of the attention of the Society. Cases of absence of the greater portion of the tongue, from operation or disease, and in former times from malefactors being condemned to have it removed, are occasionally to be met with; and it has been even stated to be congenitally absent, but it was seldom indeed that so complete an absence of the organ had been seen as in the case now exhibited to the Society. The gradual improvement of the articulation which occurred in this case has also been observed by Louis, in a memoir in the 5th vol. of the *Mem. de l'Academie Chirurgicale*, in which an individual, in whom the greater portion of the tongue was absent, suffered at first from very imperfect articulation and deglutition, but gradually improved in these functions in a very marked degree. In Malgaigne's edition of 'Ambrose Paré,' 1840, tome ii. p. 608, a description is given of the case of a man who had his tongue almost completely cut off, losing in consequence the use of speech completely for three years, but was afterward enabled to make himself understood by words, by inserting under the remaining stump of the tongue a thin slice of wood. Dr. Banon regretted that the history of the case, which he had obtained with great difficulty, owing to the sinking state of the patient when he first saw him, was not more perfect, as he was sure the Society would agree with him in considering the case, and the state of parts which he had now the honor of exhibiting, as most rare and interesting."—(*Dublin Med. Press.*)

"A Case of Progressive Atrophy of the Tongue and Muscles of Speech—Subsequent Loss of Power—Great General Atrophy—Post-mortem Appearances. Reported to the Royal Medical and Chirurgical Society, by MR. EDGAR BARKER, JUN.—Since the publication in the *Medico-Chirurgical Transactions* in 1851, by Dr. E. Meryon, no other case of this description had been brought before the notice of the Society. The subject was a gentleman, aged 51, who had enjoyed excellent health till May, 1859, when a slight difficulty of speech, accompanied by general failure of health and strength, induced him to seek medical advice. These symptoms, without any apparent cause, with the addition of impairment of deglutition, continued to increase; and on the following September, after some months' residence at the seaside, the tongue had assumed the following remarkable appearance: small and shrunken, it lay low in the floor of the mouth, and over its whole surface was noticed an unceasing tremulation of the fibrils of its muscular structure; it had lost its bright healthy hue, and was of a pale-yellow color. His face had also lost its ordinary expression; the cheeks and lips were flaccid, and hung down. Saliva frequently dribbled from the mouth. No symptom whatever of irritation of brain or spinal cord was ever present, but the muscular tissue in different parts continued to waste and degenerate with unrelenting pertinacity. Gradually articulation became unintelligible, and deglutition impossible. The fibrillary tremors so noticeable during the wasting of the muscles ceased with their destruction. From the tongue to the muscles of deglutition, thence to those of the upper and from these to the lower extremities, the disease extended. At length the intercostals were affected; and the breathing consequently at times be-

came much labored, as each morning brought increasing difficulty in the necessary expulsion of mucus collected in the bronchial tubes during the previous night. Great exhaustion followed these attacks, and on the morning of the 15th October, 1861, he gradually sank. Various remedies had been for many weeks together tried, but none seemed in any way to arrest the steady onward progress of the disease. Cod-liver oil, quinine, iron in various forms, zinc, strychnia, and the constant use of galvanism, were the principal agents employed. The post-mortem examination of the tongue went to prove that in its entire extent it had been converted into a soft, pale-yellow mass of fatty tissue. The papillæ were shrunken, and most of its muscular fibres were replaced by oil-globules, amid which granular and fat-laden fibres were here and there scattered; and of the muscles attached to the tongue, only the genio-hyoglossi and stylo-hyoglossi retained any manifest traces of their form and structure. The nerves of the tongue, so far as traceable, were natural; no apparent softening or atrophy of them could be detected; muscular fibre in the arches of the palate and in the uvula were chiefly natural, save here and there. The same granular appearance was noticed in the pectoralis major and in a portion of the left ventricle of the heart, and in the left side of the diaphragm. In all, the muscular fibre was in great part natural, though each specimen in an equal degree contained stray fibres, which were losing the clearness of their transverse markings, and becoming granular with fatty deposit. The examination, worked out with the greatest care and by accurate observers, failed to bring satisfactory evidence of any change in the nervous tissue supplying the affected muscles, either in their centre or peripheric extremities; but, on the contrary, the examination tended to strengthen the present prevailing opinion that the disease is essentially in the muscular tissue itself, and must yet be looked upon as akin to that condition frequently met with in the left ventricle of the heart, and known as fatty degeneration."—(*Med. Times and Gaz.*)

Quinia as a Local Antiseptic.—DR. R. GIESELER has been led to adopt the use of quinia as a local antiseptic, (*British Med. Journ. and Dublin Med. Press.*) and, in illustration of its beneficial effects, relates, among other cases, the following "of noma, occurring in a child three years old. Dr. Gieseler was called to this patient on account of an ulcer at the right corner of the mouth; this was, however, found to be connected with gangrenous disease of the cheek, which was much infiltrated, and, although the skin was unaffected, gave on examination signs of being destroyed in its entire thickness. When Dr. Gieseler attempted to raise the lip carefully for the purpose of examining its inner surface, laceration of it near its middle and of the right ala nasi took place without hæmorrhage, and showed these parts, as well as the external surface of the alveolar border of the upper jaw, to have been changed into a gangrenous mass, having an offensive smell. The thickly infiltrated gangrenous parts were removed by incisions made from the laceration already described upwards to the infraorbital process, and thence obliquely downwards and to the right. No hæmorrhage took place. To the exposed dirty gray anterior surface of the upper jaw, in which no trace of organization was apparent, Dr. Gieseler applied a sponge soaked in solution of sulphate of quinia, over which he laid some wadding, and secured the whole with a bandage. The right nostril was kept open by means of a piece of sponge, also soaked in the quinia solution. On the next day, a dark-brown border, a line in width,

had formed in the inner and upper part (near the canine fossa) where it was found the sponge had not rested; but there was no extension of the gangrene elsewhere. The applications were renewed every few hours, the parts being carefully cleansed by affusion on each occasion. Healthy granulations appeared at the edges of the wound on the second day. Even at this time, when the process of separation first commenced at the centre of the exposed surface, the offensive smell had ceased; and neither then, nor subsequently, did the child appear depressed, but took its food readily, and played as usual, although confined to bed. No internal remedies were given except an occasional mild aperient, when indicated. The child was first seen on October 9th; and on November 11th the process of cicatrization was complete, leaving the parts in so satisfactory a state that a trifling plastic operation alone was required to remedy the defect that remained."

Arsenite of Copper.—In the course of an interesting article on arsenic for ornamental and surgical purposes, (*Lancet*), Mr. JOHN TAYLOR, of Liverpool, speaks highly of this agent as a sedative escharotic. These properties may render it useful in dentistry, but as its color will doubtless prove objectionable, some of the lighter salts of arsenic, those of zinc, and lead, for instance, may probably be employed with more advantage, especially for the destruction of dental pulps and sensitive dentine. He remarks: "Of far more importance than household decoration, however, is the surgical fact I have discovered, that the arsenite of copper is a valuable *escharotic* and *sedative* in sloughing and malignant ulcers and epithelial cancers. Sulphate of copper has been long known as a popular escharotic; nitrate of copper more recently; each having its respective merits when skillfully selected. And, on reflection, we should expect that arsenite of copper would possess the soothing remedial agency of arsenic along with its well-known preservative power over organic structure; while the copper acts stringently on all that is vital, and detergent on that which is effete. This metallic salt has also the further advantage, that neither ingredient is poisonously absorbed, which cannot be said of either when used separately. Wherever the arsenical paste is applicable, this arsenite may be used. It is very superior to arsenious acid, in arresting fetor and not acting poisonously through absorption when fungous and sloughing surfaces have become granulative. The universality of this fact, however, can alone be established in extensive hospital practice. To those possessing large opportunities for testing the value of suggestions for improving this barren field of surgery (malignant ulceration) I commend the use of a paste composed of equal parts of the arsenite of copper and mucilage of acacia, applied by a thick camel-hair brush, or by means of a spatula, on the spongy fungous growths which usually block up the orifice of cancerous infiltration, and in the latter stages of carcinoma. It gives no pain, and its first effect is to completely arrest the fetor, even when it has been intolerable under the partially restraining influence of the best disinfectants. In an hour, or less, a thin brown excretion flows copiously from the disintegrated cells, which in a day or two become so broken down as to leave a free aperture. In forty-eight hours the fetor returns if the dressing be not renewed. Too free an application within cavities I have seen temporarily repress the infiltration and induce slight inflammatory reaction; soon, however, restrained by a fomentation or poultice. In epithelial cancer about the face it would be well to further dilute the application."

Silicates.—"Gelatinous silica being known to be soluble in alkaline solutions such as those of caustic soda, it might fairly be presumed that it would also be soluble in an alkaline silicate, although I am not aware of this having been published as a fact.

"But the same property could not probably have been anticipated of the silicates of the earths and metals. The silicate of magnesia, for example, in the gelatinous or recently prepared state, is not soluble in a solution of caustic soda, but readily so in a solution of silicate of soda: and the latter rule holds good through all the series of silicates.

"The solvent power of the alkaline silicates seems, therefore, to be altogether different in degree and in other important particulars from that of other alkaline solutions. Hence through this property we have soluble glass in as great variety and of tints as various and delicate as we have in stained glass. The soda silicate of cobalt is of a beautiful rose color—that of chromium green, etc. But the tints of the metallic-colored silicates are modified by solution in the colorless compound soluble silicates—that of copper, for instance, in a soda silicate of magnesia, is different from that of its solution in silicate of soda.

"The above facts will, I think, be sufficient to indicate the importance of a true knowledge of the compound soluble silicates in geology and mineralogy, and lead to a more exact explanation of the color of a great number of minerals and of many of the precious stones.

"The silicic acid of the alkaline silicates again displaces the carbonic acid in carbonates, even at the ordinary temperature, and very rapidly by the aid of heat. This fact will aid toward explaining the formation and composition of many rocks, and be a guide in the production of artificial stones in endless varieties.

"As regards agriculture, the ammonio-silicates seem not only to be the most soluble, but also to possess the greatest solvent powers of all the alkaline silicates. When we add to the series the phospho-silicates, also highly soluble, it seems to me that a field of investigation is laid open worthy of the highest science of the day in the department of agricultural chemistry, and which, if followed, is likely to lead to practical results of vast importance, and to a true solution of many things that have not hitherto been satisfactorily explained.

"There is still another field open to investigation with these interesting compounds, namely, the use of them as antidotes to poisons.

"For this purpose I would suggest the soda silicates of magnesia, alumina, and lime. In case of any poisonous mineral salt being taken, an instantaneous precipitation of an insoluble silicate would occur in the stomach, and probably without the least injurious effect to the coats thereof, by prompt administration of a dilute solution of any of the above-named compound soluble silicates, or of a solution of silicate of soda saturated with gelatinous silica. It is a question which I have commenced investigating, whether the alkaloids may not be rendered insoluble, and therefore inert, through their means."—(HENRY ELLIS, *Chem. News.*)

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Hardening Friable Substances.—It is well known that friable substances may be preserved entire by running into their interstices some material which will readily soften at a moderate heat, and harden at ordinary temperatures. Among the articles recommended for the purpose, is a compound by Mr. STAHL, (*The Reader*,) "of 1 part of resin and 3

parts of spermaceti, to be applied hot, by means of a hair pencil, to the surface of fragile fossils, to prevent them from crumbling away and to permit of plaster casts being taken. When the fossil is friable, but compact, the resin is omitted. To remove a fragile fossil from its bed when it is too moist to permit of doing so without breaking, he coats it with spermaceti, and then passes over it the flame of a cotton wick dipped in spirits of wine. The spermaceti is absorbed, and, in a short time, the fossil may be removed entire without difficulty."

"Manipulation of Metals.—There are many occasions where a knowledge of some simple alloy or a peculiar solder would save hundreds, yes, thousands of dollars, just as a life may be saved by merely tying a pocket handkerchief tightly above a bleeding artery. It is only a few years ago that the valve-stem on the engine that runs the *Herald* presses broke in the dead of night, when but half the edition was run off. This was a dilemma, indeed, for a valve-stem is not made in half an hour, neither can it be bought at a hardware store like a pound of nails. The engine was injured in a vital part, and unless it was mended the entire edition would be stopped and incalculable loss sustained. Fortunately for the proprietors there was one of the employees present who understood the manipulation of metals, and he informed the by-standers that if they would collect their spare silver he would restore the broken part to a condition of usefulness.

"It was done.

"The stem was brazed with silver solder, and the engine performed until morning, so that the whole edition was successfully run off. But for the presence of the adept referred to, and his knowledge of this simple process, very great loss would have been incurred.

"Some of our readers may be caught in just such a predicament, and we therefore append a formula for a solder which will braze steel. It is as follows: Silver 19 parts; copper 1 part; brass 2 parts; if practicable, charcoal dust should be strewed over the melted metal in the crucible.

"A good article of yellow brass is extremely desirable for fine work in telescopes and optical instruments generally. A metal that works free and soft under the tool, and is capable of receiving a fair lustre from the burnisher, is always in request. A good yellow brass can be made from the following metals: That denominated 'watchmaker's brass' is made of one part copper and two parts zinc. German brass is equal parts of copper and zinc; the addition of a little lead makes the metal work easier and less liable to tear under the tool.

"In all these mixtures the zinc must be added last, as it is a volatile metal and fuses at a much lower heat than the copper; the melting point of which is 4587 degrees, while that of zinc is only 700 degrees.

"Iron and brass must be united by spelter, which is equal parts of brass and zinc. When the joints are cleaned and wired together, fine powdered borax is applied to them as a flux. The solder is then dusted on in the form of a powder, or fine filings, and melted in, either with a blow-pipe or by being placed in a charcoal fire. Care must be taken not to melt the brass to be brazed. The solder of course has a much lower fusion point than the metals to be joined, else they would both run at the same time.

"A simple method of case-hardening small cast-iron work is to make a mixture of equal parts of pulverized prussiate of potash, saltpetre, and sal ammoniac. The articles must be heated to a dull red, then rolled in

this powder, and afterward plunged into a bath of 4 ounces of sal ammoniac and 2 ounces of the prussiate of potash dissolved in a gallon of water.

"These simple rules are practical, and will give good results with good workmanship. If the cast-iron is overheated and burned, the unskillful workman must not blame the formula for his failure; or if he puts on such a blast as to blow the solder out of the joints, when brazing, and instead of making a joint spoils the job, he must not charge it upon us, but keep a brighter look out in the future. Good rules are useless unless put in force and practiced with skill and intelligence."—(*Sci. Amer.*)

Silvering.—Cold silvering may be performed on brass and copper which is well cleaned and quite bright, by rubbing with a moistened cloth, dipped in the following powder: 1. Chloride of silver, 2 parts, pearlash, 6 parts, salt, 3 parts, whiting, 2 parts; mix. Or, 2. Precipitated silver, 1 part, common salt and cream of tartar, each 2 parts; mix. When the metal is silvered, it should be washed in a hot weak solution of alkali, and then wiped dry. Other silvering powders are: 3. Nitrate of silver and salt, of each 1 part, cream of tartar, 7 parts. 4. Nitrate of silver, 1 part, cyanide of potassium, 3 parts. 5. Bath. Nitrate of silver, 15 parts, sulphate of soda, 100 parts; dissolve in water, and dip the article into the solution."—(*Ibid.*)

Marble Cement.—It is stated (*Ibid.*) that "a very fine marble cement is made by soaking plaster of Paris in a strong solution of alum, after which it is baked in an oven and then ground to powder. The powder is then mixed with water and applied as wanted. It sets very hard and takes a brilliant polish. It may be mixed with metallic colors, such as red-lead, so as to produce an imitation of marble."

Brass Polish.—"Brass ornaments, when not gilt or lacquered, may be cleaned and a fine color given to them by either of two simple processes. The first is to beat sal ammoniac into a fine powder, then to moisten it with soft water, rubbing it on the ornaments, which must afterward be rubbed dry with bran and whiting. The second is to wash the brass-work with rock alum boiled to a strong lye, in the proportion of an ounce to a pint; when dry it must be rubbed with fine tripoli. Either of these processes will give to brass the brilliancy of gold."—(*Am. Artisan.*)

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Memoranda on Poisons. By THOMAS HAWKES TANNER, M.D., F.L.S. Philadelphia: Lindsay & Blakiston, 1864, 24mo., pp. 112.

This little work is a reprint of an English manual on poisons. It affords a very good summary of toxicology in its practical relations, and will prove a useful adjunct to the student and practitioner of medicine.

The Physician's Visiting List, Diary, and Book of Engagements for 1865. Lindsay & Blakiston.

The character of this well known hand-book is sufficiently indicated by its title. It is well-arranged, but, like the preceding, of more immediate practical value to the physician than dentist.

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, NOVEMBER, 1864.

No. 4

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Removing Plugs for Treatment of Toothache.—This is an operation which we often resort to for inflamed pulps, as well as for alveolar abscess, and as it is of frequent occurrence, it is time that there was a decided opinion expressed on the subject.

It does occur in the hands of every dentist, that a pulp will become exposed, or at least take on inflammation after a tooth is plugged, no matter whether it be in the hands of one who believes in a deposit of secondary dentine, or one who does not. When a pulp is nearly exposed it is difficult to decide, nay, impossible, whether the case will remain perfectly safe to the end or not. Under such circumstances, we always give the patient the advantage of the doubt. If pain ensues, it is better to remove the plug and treat the pulp than to have treated it at first, as we regard it as a great misfortune to destroy a pulp. If a patient calls in, suffering under such circumstances from another dentist, we do not complain, but if the patient has called five or six times on his dentist, and begs that the plug be removed, and the dentist refuses, applies leeches to the gum, cold water, advises a purge and other remedies of a local and systematic character, without removing a plug, it is cruel, to say the least, if not reprehensible; and yet this does constantly occur.

All theories with regard to the pathology of the pulp fade to nothing when the patient is suffering; every one ought to know that when a pulp is inflamed and suppurating, that the tooth requires local relief; the pus that is poured out in the pulp cavity must be discharged through the tooth, or it will end in alveolar abscess, and with prolonged and unnecessary suffering. These cases of inflammation of the pulp have become much more numerous since the introduction of soft fillings; when teeth are tender, the soft filling is resorted to without cleansing the cavity suffi-

ciently to determine whether it is really a nerve exposure or only sensitive dentine; this is inefficient and bad practice; a cavity ought not to be filled until it is ascertained whether the pulp be actually exposed or not; there are a sufficient number of palliatives known now to accomplish this end without much risk of inflaming or destroying the pulp. There should be no cases of inflammation of the pulp under a plug, except where a thin portion of dentine is left to protect it, and does not prove sufficient; and this may happen to the best practitioners. We have several patients in our practice whose teeth are of a very sensitive and morbid character. After a tooth has been plugged for several years, and the pulp well protected, it becomes inflamed, the plug has to be removed and the pulp treated. A case in illustration, a young lady: when the patient first applied to us it was for inflammation of the pulp of the right superior lateral incisor; it had been plugged six years; we had to cut some distance before opening the pulp cavity. Several cases of the same kind have occurred to the same patient since, after we plugged the teeth, and believed there was sufficient dentine to protect the pulp for all time; we do not know how to guard against such cases. Sometimes cases of inflamed pulps become very difficult to handle, because, before the patients call, the periosteums have become so far involved that the teeth can scarcely be touched, and if the teeth are so close together that the plugs cannot be reached, and they are cement fillings, Townsend's, Wood's, or the os artificiel, we drill the teeth at the necks, as that can be done with a fine drill with less pain than to cut out the plugs. We might say a word here about those fillings; they are all perhaps well enough in their proper places, but to use them regardless of the future welfare of the teeth, they are a great evil; in using them the future pathology of the teeth should be carefully considered. To place a Townsend's amalgam or a Wood's metal in a tooth where the pulp is liable to inflammation, or where there is a doubt as to whether there is sufficient dentine to protect the pulp, is bad and dangerous practice; gold is much more readily removed than either of those metals; if it be a doubtful case, Hill's stopping is a much better *test plug*. We have a young gentleman under treatment, at present, who has all kinds of plugs in his teeth—Hill's stopping, Wood's metal, Townsend's amalgam, and gold; the gold fillings have been well done, but the other materials have been used according to the localities of the cavities, and the different sensibilities of the teeth, without regard to the teeth being in condition for receiving plugs or not; and any one with a proper idea of the diseases of the teeth, can fancy what a condition the patient finally got into, and any one can imagine what a time we have had in getting out those hard fillings, to get to the pulp cavities for treatment. But what are we to expect, when the inventors of these materials urge their use in tender teeth; or, in other words, that they are useful when teeth are too tender to be plugged with gold? When they are used by the ignorant

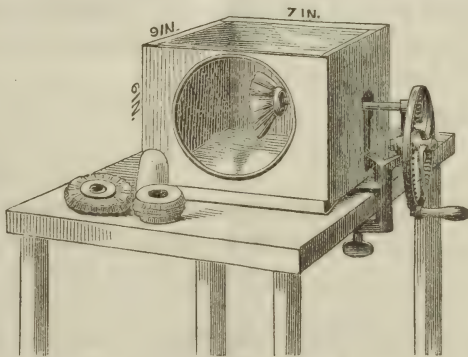
to get rid of placing a tooth in proper condition for receiving the filling, God help the patient! And when they are employed, to escape the trouble attending proper treatment and economy of time, or proper study of the diseases to which the teeth are liable, what hope have we for the elevation and advancement of our noble art? As attempts are made to save teeth in a critical condition, at the present time, as there is a higher appreciation of the natural organs more than formerly, it requires more care and a higher order of education to practice dentistry, instead of a less.

(To be continued.)

POLISHING WHEEL CASE.

BY J. CARROLL HOUSE, D.D.S.

THIS little improvement is well set forth by the accompanying illustration, and which we use with either the foot or hand lathe, (always preferring the latter.) It consists of a sheet-tin or copper vessel, resembling



in its outward appearance the body of a stage-coach as nearly as anything, minus the top, which is fitted with a common 7×9 window-pane made to slide in and out freely for clearness. One end is curved from the bottom upward, while the opposite end is vertical to the base, and is provided with a circular opening, some $4\frac{1}{2}$ inches in diameter, serving as an arm-hole, through which the hand can be thrust, as it holds the plate to be polished against the brush or cork. The holes in the sides of the case through which the mandrel of the lathe passes must be arranged and adjusted to the height of the lathe used. If it be a bench or hand lathe, as also the "Snowden" or "Chevalier" lathe, the opening will be as in the view; but for the common foot-lathe, with the belt pulley and mandrel at the left hand, the opening would be on the opposite side. In the centre of the bottom, opposite the opening for the mandrel, is a "pit" or shallow dish-shaped portion, some $3\frac{1}{2}$ inches diameter and $\frac{1}{2}$ inch deep, made to

serve as a gathering place for the polishing material, directly under the brush or cork. This is "raised," as the turners express it, in the bottom piece, with a round-faced hammer on a block of wood. The unsteadiness of the case which this "dish" would otherwise produce, as it stands upon the bench, is obviated by a couple of V-shaped strips soldered one across each end, which thus act like legs to the concern. There is a slot cut from the mandrel hole down to near the bottom, thus permitting the lifting of the case, and the brush to be rotated in the polishing powder, and gather upon itself the same.

Thus briefly have we described one of the most convenient contrivances that we have in our laboratory, by which we are enabled fully to protect ourselves and our lathe and its surroundings from all "flyings" of brushes, etc., yet at the same time have complete view and control of the work. The glass slide will need an occasional washing; generally, however, the powder, which becomes deposited on the under side of the glass, may be scraped off with a thin metallic strip, which could be kept constantly in the case as a convenience for scraping the sides and end.

I hope, from the view and description given, any one who would prize anything that really adds to the comfort of laboratory work, can, by the aid of the tinsmith, get one of these cases made, and, when made, may it prove as useful as it has to the writer.

LOWVILLE, N. Y., July, 1864.

TO PREVENT RUBBER FROM ENTERING THE JOINTS OF BLOCK TEETH.

BY P. J. K.

As any idea, however limited in value, is always acceptable to a dentist, I desire to state a method by which a great evil can be remedied.

I refer to the disagreeable appearance of the joints of blocks in rubber work. The following plan has proved successful in my hands:—

After the teeth are ground and wax arranged, mix equal parts of *vermilion* and plaster of Paris with water, and pack it close around the joints of the blocks; place the case in the flask; after the flask is separated, remove all the wax, especially between the joints, and place therein a little vermilion moistened with water; then fill the rest of the joints with equal parts of vermilion and plaster; this will harden in a few minutes when it will be ready for packing. After the piece is vulcanized, the mixture on the outside of the joints can be readily removed, leaving the joints as clear and beautiful as when first ground.

NEW YORK CITY, Aug. 15, 1864.

FRACTURES OF THE LOWER JAW.

BY H. MEREDITH WHITE, M.D., A.M.

It frequently happens that cases of fracture of the lower jaw fall into the hands of the dentist, and they are sometimes called on by surgeons having such cases under treatment, to give advice about the preservation or removal of certain teeth which complicate the lesion. Bony union, in a case of fracture of the inferior maxilla, is difficult to obtain; ligamentous union is most always ultimately established, but there are some cases with apparently none at all—either through mismanagement, or want of nutrition in the part, which latter, in most cases, is the main difficulty to contend with. Immobility is hard to get. The usual bandages and ligation of the teeth, with silver wire, will keep the parts in position; but as it is necessary for the patient to partake of food, it is impossible to avoid motion of the parts, disturbing the contact of the fragments, which is necessary to be preserved for a long time to insure success. The pressure on the ends of the fragments, held together by the bandage, produces irritation, which causes that kind of union that is brought about when ivory pegs, or silver wire, or setons are used, to promote adhesion in fractures of other bones, that are slow in the process, which kind of union, it would seem, is desirable to avoid.

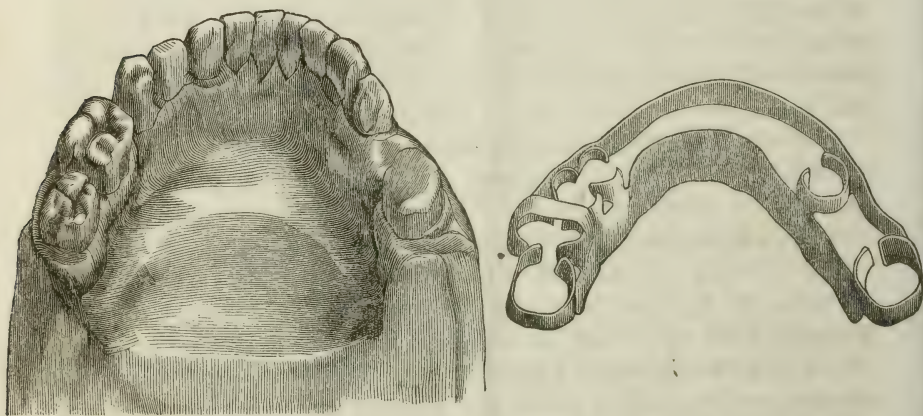
In cases of oblique fracture, the bandage is rather unmanageable, and it is almost impossible to counteract the tendency of the internal pterygoid muscles, drawing the rami inward. A plate, however, entirely overcomes it, and distributes the bearing equally.

The following case occurred in the practice of Dr. J. D. White:—

Case.—W. L., aged forty years, light complexion. On the 20th of February, 1860, was struck on the point of the chin with a “billy,” or “black-jack,” which caused a double fracture of the jaw, the lesions being situated in corresponding places, viz., between the second bicuspid and second molar teeth of each side, the first molars being lost some years previous. A slight bruise was present at the point where the blow was inflicted, otherwise the soft parts presented no external appearance of injury.

The patient, soon after receiving the blow, called on a surgeon of this city, who applied ligatures to the teeth, and pasteboard, softened in warm water, around the chin, the whole supported by the usual bandage for the fracture. The patient was directed to live on soft food, and keep the parts as quiet as possible. The treatment was carried on for nearly four months, without much improvement—no bony, but apparently slight cartilaginous, union. The surgeon, seeming reluctant to pursue the treatment, and the patient becoming discouraged, the apparatus was removed and the injury neglected, until August, 1860, when he called, as a friend, to get advice. The fragment was very movable, and the parts around

the fractures very tender, reddened, and swollen. The patient was advised to have an impression of the mouth taken, and a plate made to keep the parts steady, and the fragment in contact. The impression was taken in this manner, which will, doubtless, be found useful in similar cases: A lid of a cigar-box was cut, so as to fit the anterior part of the neck, and project two or three inches in front of the chin, and two or three inches on each side. This was placed closely under the base of the jaw. The broken bone was as accurately as possible adjusted; a napkin was placed around the jaw, and between them plaster of Paris was poured, and was kept from running away by the napkin. In this manner, a mould of the outside of the parts, nearly as they were before the injury, was obtained. When the plaster had become sufficiently hard, the mouth was gently opened, and a wax impression taken without displacing the fragment, and without pain, in as perfect a manner as if there had been no fracture. A plaster-cast was made, and a silver plate to fit, extending half-way up the backs of the front teeth, but about an eighth



of an inch from them. Clasps were fitted to the second and third molars, and first and second bicuspid of the left side, and to the first bicuspid and second molar of the right side, that being the only molar on that side. The second bicuspid was very loose, and was finally extracted; a silver band was placed, so as to press firmly on the anterior surfaces of the front teeth in the detached fragment, and soldered to the bands, surrounding the teeth of both sides. When this plate was properly adjusted, there was no possibility of motion, and the fractured bone was held firmly. There was no necessity for any other apparatus. The patient was comparatively at ease; from time to time the band in front of the teeth was shortened, and gradually brought the fragment to its proper place. The plate was worn steadily for three months, when, prematurely, the patient took it off. At that time the left side was firmly united by

bone; the right side, however, was still movable, owing probably to some injury sustained by the dental artery; the ends of the bone became in time rounded off, and lapping. Had he persevered a short time longer, in all probability the success that attended the left side would also have been accomplished on the right. At that time the patient could chew a water-cracker on the left side of the mouth comparatively without trouble.

The above case is reported to show with what ease similar cases can be handled by means of a plate, which method is much superior to any other. The figures show the plate and cast of the jaw.

FILLING TEETH.

BY WM. H. ATKINSON, M.D.

Read before the Brooklyn Dental Association, Oct. 5th, 1864.

THIS, like every other professional labor, involves a knowledge of principles, as well as the execution or fulfillment of the detail of that which principle indicates as necessary to the accomplishment of the work. Ideal and actual hold close relationship. The more complete and well-defined is the ideal, the more useful and enduring will be its practicalization.

Much has been said as to the relative merits and necessity of theory and practice. One set of teachers advocating the paramount importance of clear understanding of principles, underlying all correct practice; another busying themselves with the *how* of the practical performance of the work, ignoring the *why* it is so done. The first are philosophers, the second empirics. Empiricism has pioneered the way to a knowledge of principle; while philosophy explains and appropriates the good and useful, rejecting the irrelevant and injurious empirical gatherings.

He who has no well-digested system is liable to err at each successive step in his progress; but he who has a well-defined conception of what *ought*, and what, under the circumstances, *can* be done, is ever ready to take such measures only as are necessary to the perfection of his executive purpose, knowing when he has done enough and when the work is complete, in necessary as well as ornamental process and measure.

The only work that can be complete is that which has a *plan* and *execution*, in equality of agreement of conception and performance in the same individual or individuals who accomplish the work.

What, then, is this ideal up to which we are required to bend our efforts to accomplish our purpose to *save* teeth by filling?

Ans. To so prepare the cavity of decay, in cleaning out the disintegrated portions of tooth substance, as to secure adequate hold in dentine to retain the filling, when inserted with sufficient tenacity, to prevent its

dislodgment by the force brought to bear upon it in mastication and other necessary processes; also to so shape the edges of the cavity as to secure a flange-like bevel on the margins of the filling, so it may reciprocally support the enamel and dentine, as the dentine retains in place the gold in the depth of the cavity.

Now, the best means to secure this condition of things are wedges and properly-shaped files. The wedge should correspond, in shape and size, with the cervical spaces between the teeth into which the festoon of the gum so nicely fits, excluding foreign matters in cases of healthy mouths.

Let the wedge gradually diminish in size by a nice taper to a point upon which to catch the napkin upon the inside the upper denture, securing the filling from the dampness of the breath, rounding off the sharpness of the corners to prevent breaking the cells of connective tissue and blood-vessels in the gums.

After driving the wedge "quite home" with the mallet so as to press the teeth against their fellows, and apart, also press the festoon of the gum quite away from the margins of the cavity of decay; use flat, rounded, beveled, or other shapes of files to secure the proper form and strength to the margins of the cavity. The next step is preparation of the cavity proper, so as to retain the gold without exposing the pulp, in fact, or by compromising too far the wall of dentine that should intervene between the pulp and the filling.

If all the steps indicated have been properly taken, all that remains to secure the tooth against further mischief in that cavity is, to proceed to fill it, air and moisture tight, throughout its entire *margin*, and nicely finish it up, and the work is accomplished.

N. B.—The trimming down to the proper shape, consolidating and burnishing the surface, or stoning it, as most desirable to patient and operator, should all be done *before* removing the wedge.

The best means of trueing the filling to the proper rotundity and level at the margins will be found in flat strips of some flexible tissue, capable of being charged with polishing powders, such as tape, chamois skin, sand-paper, and the like.

I have elsewhere asserted that a filling, to be first-class, must possess two prerequisites, viz., 1st, be capable of retaining firm hold upon the dentine within the cavity for its reception; and 2d, embrace the margins of the cavity, so as to reciprocally hold its frail edges, preventing, checking fractures, or leakages, thus rendering it at once a restorer of the contour of the tooth, as well as a preserver of its vitality and usefulness.

Two positions in the teeth are peculiarly liable to become subject to decay, viz., First, the fissures in the grinding surfaces; and second, the approximal edges where it is difficult to keep them free from the lodgment of acidifying and putrescent substances.

Cavities of the first class are prepared and filled with a moderate endowment of discernment and manipulative skill; but the second requires the shrewdest powers of observation, and the very best mechanical conception connected with manual skill competent to execute its difficult behests.

To prepare cavities in the fissures of the grinding, buccal, and lingual surfaces of the bicuspid and molars, all that is necessary to success is, to have a correct conception of the extent of the decay, which will dictate the form of instrument adequate to the work. Carefully clip, trim, or file off the friable margins of the cavity down to the solid dentine for a support to the enamel columns, when they are beveled or countersunk, after the manner of fitting a screw-hole in a board for the reception of the flange or head of the screw, so it may sit upon a level with the surface of the board in the one case, and the filling conform to the contour of the tooth in the other, and you have accomplished all that is necessary or desirable, so far as the mouth of such cavity is concerned. But to prepare the inner portion of such cavity to fit it, to suitably receive and surely retain a useful filling, it is necessary to secure at least two opposing plains that are on a parallel to each other, so as to retain the filling when well consolidated. It is preferable to secure several points or pits, called retaining-points, anchorages, etc., that diverge enough to constitute spurs or clinches, to secure the immovable retention of the first portions or depth of the filling, and oppose the flange-like margins above noticed, giving the patient and the operator confidence in the security and permanence of the work.

This class of cavities is easily filled by using nicely-adapted serrated points, and the mallet by beginning to pack in the spurs or retaining-pits, and welding the gold into a solid mass as you proceed; packing first against the walls of the cavity and over the beveled margin, thus retaining the exact contour of the original fissure, cusp, or equally rounded form of the particular locality to restore natural shape. When enough gold is in place to meet the design, and is yet rough with the instrument marks, fold No. 6 adhesive foil, 6 or 8 ply, into a ribbon and lay it all over the surface, so as to be sure to reach beyond all the margins, and then, with a mallet and a suitably-shaped burnisher, pass over it, driving it smoothly into the pits, and welding it evenly down so as to avoid waste in finishing. A little practice will enable one to properly determine just at what stage to use the ribbon, so as to secure the desired fullness, and no more. In case any point is too full, the file, burnisher, and stone in bulk, or in powder on a stick, will enable the operator to secure a perfect face, and finish.

EFFECTS OF A FILLING IMPINGING ON THE NERVE OF A SUPERIOR MOLAR.

BY FREDERICK OLIVER, M.D.

FOR several years past, it has been my practice, as I once wrote you, of extirpating the dental pulp where it could be readily got at and was exposed, and filling the cavity of decay and dental chamber immediately, instead of treating the nerve with arsenic and filling the roots, chamber, and cavity of decay in the more usual way.

My reason for preferring this course, as I then stated, is to retain a portion of the living nerve, to the end that inflammation and ulceration of the roots should be avoided, and certainly while the periosteum and nerve branches in the roots remain alive, preventing it altogether.

An insuperable objection occurs to this course in ordinary practice—the severe pain of extirpating the pulp. This objection I completely overcome, and render it a painless operation in almost every case by introducing cautiously a gentle current of electricity through the drill with which I perform the operation, by commencing with a very weak current of electricity, and increasing the strength after a few seconds. As I proceed, I almost invariably extirpate the pulp absolutely without pain.

I have filled a great many teeth in this way with the most gratifying results and unvarying success. In fact, out of several hundred teeth that I have saved by this means, I have had but one case in which any untoward or painful symptoms followed, and which I lost; and this I wish to place on record, as it was very peculiar, and illustrates the importance in this practice of completely clearing the dental chamber of every portion of the pulp.

A gentleman, aged about forty years, of an irritable and nervous temperament, had in the second superior molar left side a large cavity of decay, exposing the pulp; it had been sensitive some time, but had never ached. With the assistance of electricity I extirpated the pulp without pain, and filled with gold foil handsomely and satisfactorily. Four days after the operation he returned, complaining of a sense of fullness and a dull, heavy pain in the cheek, with a most severe headache. I concluded that inflammation of the periosteum of the tooth had supervened from the irritation of the operation, and advised counter-irritants over the roots of the tooth and cold affusion to the face and head.

This gentleman lived some distance from town, and he did not come again until the tenth day. The case now appeared quite serious, the pain being constant, embracing the whole side of the face, and extending up into the frontal sinuses, where it was most severe. There had been for the last two days, he said, a slight but constant discharge from the left nostril of colorless, almost inodorous fluid; he was quite weak from loss of sleep, and had considerable irritative fever. The tooth was not

painful on being struck—indeed, from the beginning there had been no pain in this tooth particularly; and his physician had treated him for an attack of neuralgia, and, finding his remedies of no avail, advised him to return and consult me. I concluded, at once, from the symptoms, that there was severe sympathetic inflammation of the lining membrane of the antrum, extending into the frontal sinuses, and determined to lose no time with palliative measures, but extract the tooth, feeling sure that was the exciting cause of the trouble. After extracting the tooth, I made a free opening into the antrum, through the socket, but there was no discharge; the pain, however, subsided gradually from the moment the tooth was extracted, and, after a good night's sleep, he was entirely free from pain the next morning. The discharge continued through the nostril for more than three weeks, but yielded, at the end of that time, to injections into the antrum, of an astringent and cleansing character.

On removing the filling from the tooth, the cause of all the difficulty was very apparent. In a sharp angle of the dental chamber was a portion of the pulp still alive, and bleeding; the gold foil had been driven into the acclivity, and had impinged most forcibly upon a small portion of the pulp, that, from its position, had escaped the instrument. It will be seen, at a glance, that this was not a case of periostitis; there was no inflammation or ulceration of the roots, or any of its accompanying symptoms, tenderness on percussion, swelling of the soft parts, etc. It declared itself, as it became developed, a case of sympathetic inflammation of the mucous membrane that lines the antrum and its connecting sinuses; and the irritative fever, which was considerable, indicated that a nerve was the seat of trouble, and so it proved.

BUFFALO, NEW YORK.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

REPORTED FOR THE DENTAL COSMOS BY R. J. HOFFNER, D.D.S.

THE regular monthly meeting of the Odontographic Society was held on Tuesday evening, October 4th, at the Philadelphia Dental College, Dr. Wm. P. Henry in the Chair.

Dr. A. C. Hawes, of New York, was elected a Corresponding Member. The following paper was then read:—

“PATHOLOGY AND TREATMENT OF DEEP-SEATED DENTAL CARIES.”

BY JOS. RICHARDSON, D.D.S.,

LATE PROFESSOR OF MECHANICAL DENTISTRY IN THE OHIO COLLEGE OF DENTAL SURGERY.

Gentlemen of the Odontographic Society of Pennsylvania:—In what follows, I shall endeavor to present for your consideration, as briefly as

possible, some reflections on the *pathology and treatment of deep-seated caries*.

All will concede, I apprehend, that the highest and most uniform success attainable in the treatment of diseased states of the teeth and surrounding structures, is that which follows upon an exact and comprehensive interpretation of the pathological conditions to be treated. In proportion, as the practitioner falls short of this requirement, will his practice become empirical, and his success uncertain. With due distrust of my own opinions, I may be allowed to express the belief that the pathology or existing conditions of deep-seated caries, uncomplicated with organic lesions of the pulp, is most fully understood, and if I can present any thoughts which may lead to a better understanding of what is a matter of practical concern to all of us, I shall not have consumed your time in vain.

In discussing this subject, I desire to exclude all those cases of actual uncovering, or exposure of the pulp, confining myself to a consideration of those in which the nerve is shielded by a thin layer of bone or animal matter. I take it for granted that in excavating to fill such a cavity with a view to the preservation of the nerve, the approved method is to allow that portion of partially disintegrated bone or animal substance lying immediately over the pulp cavity to remain undisturbed, inasmuch as it is better than any artificial substance that could be introduced for purposes of protection. Next to those cases of absolute exposure of the nerve, these are the most unmanageable, and the treatment, having in view the preservation of the pulp, the most uncertain in its results. Medicate as we may prior to filling; subdue pain and irritability; arch over the cavity; interpose non-conducting materials; fill carefully and skillfully, and yet many of these cases prove intractable, and defy our best directed efforts to preserve the vitality of the nerve unimpaired, or rescue it from death. There are two leading causes generally supposed to induce this result.

1. *Mechanical pressure*.—That pressure upon the nerve is competent to produce its death, no one will doubt; that it is the immediate and exciting cause, in many instances, is perhaps equally true. If there remain but a thin lamina of flexible bone or animal matter covering the nerve, and the filling is impacted in such a manner as to produce inward displacement of the interposed substances, in ever so slight a degree, the pulp will suffer injury. But it should be remembered that in all such cases uneasiness, or pain of greater or less violence would follow *immediately* upon the operation. This is, however, by no means the case in a majority of operations resulting unfavorably. Untoward symptoms ordinarily ensue after a lapse of time. Again, according to my own observations and experience, the results in the treatment of these cases are not materially modified by the use of *plastic* fillings, in the employment of

which the idea of pressure is fairly excluded. We may safely affirm, therefore, that while pressure upon the nerves is competent to produce, and doubtless often does produce, death of the nerve, yet many fatal cases occur not at all traceable to this cause. The most prevalent notion, however, as to the causes inducing death of the nerve in these cases, is that of

2. *Thermal influences.*—I do not question their capability of producing serious disturbance of the pulp, or of inducing its death, but, as an exciting cause to such results, I think it has been greatly exaggerated, and I submit it to the judgment of members whose experience must have afforded ample opportunities for observation, whether, in many instances, fatal terminations in these cases have not occurred entirely independent of the operation of such causes. Is not this explanation frequently rather a matter of convenient inference than one founded upon positive, or even plausible evidences of facts? In this connection, it becomes a matter worthy of consideration how much more the pulp may suffer injury from impressions of heat or cold acting through a conducting medium, than when applied immediately to the surface of the carious opening. It might be supposed that a pulp almost entirely denuded and exposed to the direct contact of hot and cold fluids, or draughts of air, together with the constant presence of fluids and other matters of an irritant character, would be more likely to be injuriously affected than when the latter were entirely excluded by an impervious conducting material, through which impressions must be indirectly communicated to the pulp. Would the sensibility of the cuticle, for example, be less affected by applying to the surface a very cold or hot substance, than if that substance were applied with a conducting material interposed? It might be reasonably supposed, I think, that the pulp would suffer most injury from extremes of temperature while lying exposed to their more immediate influence, and that a filling would rather prove protective than otherwise, especially as it excludes chemical and other irritants. But in a majority of those cases of deep-seated caries, where the nerve is not actually exposed, and which it is esteemed judicious to fill, there is previously nothing more than exalted sensibility, or some slight sense of uneasiness in the tooth—often none at all, and the first disturbance of a serious nature that occurs is that which follows upon the operation of filling.

If our premises are right, does not the conclusion follow that there are other causes than either mechanical pressure or thermal influences operating in those cases of disaster to the nerve not clearly attributable to the agency of the latter?

It is my purpose to attempt a solution of this question, and I invite your candid criticism of the views I shall offer.

As a type of the class of cases under consideration, let us take a deep-seated cavity in a molar tooth. In preparing it for filling, we find cover-

ing the nerve chamber but a thin layer of partially disintegrated bone, or more frequently, perhaps, a deposit of condensed animal matter. The patient has not suffered any continuous or considerable pain in the tooth at any time, and has only found it sensitive to impressions of heat or cold, or to the action of other local stimuli. Such, briefly, are ordinarily the conditions present in cases where it is esteemed prudent to fill without destroying the nerve. The condition of the pulp, judging from symptoms and the previous history of the case, does not seem to demand any special medication, and after the precautionary measures usually adopted, as treatment with creosote, etc., perhaps capping or arching over the nerve, or interposing some non-conducting material, the cavity is filled and the patient dismissed. In the case of a patient of unusual recuperative energies, and where all the conditions of health are more than ordinarily favorable, an operation performed under such circumstances may have a successful issue, but *failure* is the rule. In our judgment, the secret of ill success in these cases lies in a too implicit reliance upon mere symptoms, and a faulty apprehension of the morbid condition of the pulp at the time. That condition, in our judgment, is one of confirmed *passive or atonic congestion of the vessels of the pulp*. The progress of decay has been gradual, and of long continuance, and for many months the pulp has been exposed to the baleful influences of various irritating agents, as sudden atmospheric vicissitudes, hot and cold fluids, and the continued presence of decomposing alimentary matters and vitiated secretions, lodged within the cavity, acting persistently as irritants to the nerve. Can it be supposed for a moment, that the circulation in the pulp will maintain its normal condition under such circumstances, even though no symptoms of active disturbance be present? On the contrary, may we not infer that, in an organ of such extreme delicacy, vascularity, and sensibility, serious functional derangement must ensue? that vascular excitation, hyperæmia, and congestion of the vessels must be ultimately and permanently established? Reasoning from analogy, may we not also infer that, with long-continued plethora, atony of the vessels must exist in a greater or less degree at the period of decay we are considering? Now, a very constant result of asthenic or atonic congestion of a part, or organ, is *serous effusion*; familiar instances of which will occur to you. Is there any reason why the pulp of a tooth similarly affected should not be subject to the same laws that determine effusion in other organs? That it occurs in all cases of congestion of the vessels of the pulp, I do not claim; but that it is a concurrent condition in very many cases, I cannot doubt.

If, under such circumstances, effusion takes place, it cannot of course, on account of the limited capacity of the pulp chamber, accumulate, as in the case of effusions into soft or cellular tissues, or into cavities, and has but one mode of escape—that of permeation of the remaining

layer of bone or animal deposit, and thence into the cavity of decay. Without this drainage, we should unquestionably have earlier and severer symptoms of disturbance in the pulp than usually obtain in these cases, and under no other circumstances could it resist for so long a time the pernicious influences operating continually to effect its disorganization and death. The very absence of more active symptoms in these cases, and their remarkable exemption from severe and abiding pain during the progress of decay in its latter stages, can, it seems to us, be explained only on the presumption of atonic congestion and effusion, since the former is ordinarily characterized by *diminished sensibility*, while the latter relieves by direct depletion of the vessels.

Under the conditions mentioned, an *impervious* filling is introduced. In a few hours, or days at most, the patient returns with pain in the tooth. It is a continuous ache; at first slight and dull, but increasing all the while in violence. In due course of time the symptoms become actively inflammatory, and unless prompt relief is afforded, suppuration and death of the nerve follows. If this issue is not clearly referable to causes ordinarily operating to produce irritation or inflammation of the pulp, we know of no presumption on which it can be so rationally explained as that of serous effusion. The impervious filling at once shuts off the customary discharge, which is then poured out between the investing membrane of the pulp and the walls of the chamber, confining it within the pulp cavity, the nerve soon becoming close-pressed in its unyielding bony cell. Following this effusion we have exalted sensibility from unwonted compression of the nervous mass, inducing greatly increased vascular excitement and flow of blood to the part; and, unless relieved, this engorgement will quickly proceed to active inflammation, and from that to death of the nerve.

The liability to asthenic plethora of the pulp and serous effusion will be greatly modified by the constitutional habits of the patient. They will be most apt to occur in persons of lax fibre, or impaired tonicity of the capillary circulation, and in cases characterized by an impoverished or watery condition of the blood.

If the pathological views advanced are correct, the indications of *treatment* are plain. It will always be hazardous to fill such cavities with an impervious substance until the normal tonicity of the vessels of the pulp is restored and congestion relieved. To effect these objects, it has been my practice, after a careful preparation of the cavity, and without any preliminary tampering with the nerve by medication, to fill temporarily the carious opening with a mixture of plaster of Paris, partly with the view of excluding irritants, but chiefly as an *absorbent* of effused fluids, until such time as, by the use of counter-irritants to the gum, the congestion of the pulp may be supposed to be relieved. As an application to the gum, I rely almost exclusively upon the tincture of iodine, which

may be applied once a day at first, and less frequently afterward. I allow the plaster filling to remain from four to six weeks, renewing it if necessary. When admissible, constitutional treatment might, in some cases, be advantageously adopted, as the occasional exhibition of saline cathartics, and the use of tonic and astringent remedies.

Dr. McQuillen said that he agreed with the general tenor of the excellent communication just read; but, with due respect for the opinions of the author, and that of some of his other professional friends, he felt called upon to take decided exceptions to the views advanced relative to leaving a certain amount of decay in a carious cavity, rather than by its removal to expose the dental pulp. He favored *thoroughness* in the performance of *all* dental operations, and regarded it as a *cardinal principle* to remove all *softened* and *decomposed structure* found in a decayed tooth. If, under such circumstances, the pulp should be uncovered by the removal of a lamina of decay, it was not the operator that was at fault, or who was to be blamed, but the trouble should be credited to the extended character of the decay, which *virtually exposed the pulp*, and to the patient for not claiming the services of a competent operator at an earlier period, and before the decay had made such an unfortunate and destructive inroad. Believing that "a little leaven leaveneth the whole heap," he objected most emphatically to leaving any softened decay that would serve as a nidus inducing the decomposition of the surrounding healthy tissue. Recognizing the porosity of all tissues, and the permeability of all matter, whether organic or inorganic, he felt satisfied that however solid a filling might be introduced over the decayed mass, moisture would find access to it, either through the dentinal tubes or between the parietes of the cavity and the filling, and as the three conditions necessary for the production of decomposition in an organic structure (heat, moisture, and a due supply of oxygen) would be present, decay must of necessity sooner or later extend to the adjoining healthy tissue, and on account of its concealed position perform its work in an insidious manner. One of the greatest objections to the adoption of a different course from that which he advocated and practiced, was that it tended strongly to encourage an evil already too prevalent—*slovenly* operations. And it could be argued with much show of reason, if a certain amount of decay may be left in some cavities, why not do so with all? There was enough of bad work done even where the greatest care was exercised by competent operators, and it was not advisable to increase this by giving encouragement to the slovenly and incompetent. When the decay extends to the dental pulp, he invariably removes all the carious substance, and then applies the arsenical paste to the pulp. In advocating the removal of all decayed structure, he did not wish to be understood as favoring the removal of the *blackened* but *hardened* dentine frequently found in the bottom of cavities, as this was by no means in a disorganized condition.

Dr. Ellis said that he regarded the paper read as eminently practical, and bearing directly upon an operation in which we all not only feel an interest, but upon the advisability or unadvisability of whose performance we are daily forced to pronounce. He would wish to express himself in favor of the practice of leaving softened dentine in the bottom of deep cavities, where its removal would endanger exposure of the pulp, and would advocate it as emphatically as the preceding gentleman had denounced it. He did not think that the objections with regard to the permeation of moisture, either through the tubuli or substance of the filling, would hold good; for he did not believe that any appreciable amount would find ingress through the former channels, while, if it were admitted by the latter course, failure must plainly be attributable to the operator. *If it did* find admission, it cannot be denied that its influence would be anything but beneficial, and would, as had been remarked, furnish the last link in the chain of conditions favoring decomposition; yet it is not by theorizing that we arrive at the facts: here, as elsewhere, "experience" is the great teacher, and the multitude of evidence thus furnished has proven conclusively that the moisture does not penetrate through the tubuli in appreciable quantities; and cases which have been filled, according to the "conservative" method advocated, have, upon the removal of the filling, exhibited a condition which is in the highest degree satisfactory, promising to fulfill for an indefinite future the office which it has so perfectly discharged in the past. He would not say that failures never occurred, yet they are *rare, very rare*; and with such a record, he thought it unjustifiable practice to ruthlessly expose a pulp and cause its destruction, simply because caries had been so extensive as to remove the earthy constituents of the dentine immediately over its surface. He knew that the argument of *thoroughness* had been adduced as a justification; but, with the loss of a pulp, 50 per cent. or more of the vitality of the tooth is gone, a deficiency for which *thoroughness* in the operation of filling can but poorly compensate. This same argument, similarly applied in reference to very thin and frail teeth, would lead us to forego all efforts for their preservation, or unhesitatingly disfigure a front tooth by substituting for the frail enamel, partially weakened by the influence of caries, gold, the unsightliness of which, in the front of the mouth, no one will pretend to gainsay. It has also been urged that, by allowing decay to remain, a habit of slovenliness is unconsciously acquired, which leads to careless and insufficient preparation of *all* cavities; this, however, I think, would be verified only in the case of originally slovenly, careless, and unscientific practitioners, and would not in the least militate against the soundness of the practice referred to. In trying to account for the difficulty which sometimes occurs as the result of filling such cases, the theory mentioned in the paper had occurred to him, viz., the arrestation of the escape of a serous discharge exuded from the surface of the pulp; yet *pressure* and

thermal influence no doubt exercised their share in producing the difficulty. The plan suggested of filling such cavities with a temporary filling of plaster of Paris, and allowing it to remain for some weeks, might be very good; yet their number renders it a rather tedious and troublesome proceeding. He was in the habit of first applying precipitated chalk, made into a paste, by mixture with aqua ammonia, and temporarily stopping the tooth for two or three days with cotton and gum sandarac. If, at the expiration of this time, the tooth had remained perfectly comfortable, he would fill permanently, first, however, renewing the application mentioned, spreading it upon a piece of linen cloth trimmed to fit the bottom of the cavity. Under such treatment, he had met with flattering success.

Dr. Flagg regarded the paper which afforded subject-matter for the evening's discussion as a peculiarly happy record of views, which he believed were generally entertained in that *tacit* manner which as yet necessarily pertained to much connected with dental appropriations of general pathology. It was the fact that Professor Richardson had placed tangibly upon paper views which had not heretofore been just so stated, thus giving form and substance to what had probably existed but vaguely in the apprehension of many, that caused him to regard the paper as one which tended to clear up a portion of that path which, as yet, was the one most encumbered and most obscure to no small portion of those regarded by the community as "dentists." It was in acknowledgment of this appreciation, no less than the fact that the paper was presented without an official request from the executive committee, which had instigated him to offer the motion that a special return of thanks be tendered the essayist.

He still inclined to the opinion that mechanical irritation from pressure, thermal irritation from conduction, and vital irritation from contiguity of material not tolerated by living tissue, were frequent causes of devitalization of pulps after the completion of many operations connected with deep-seated caries; but it had long been the subject of remark, that notwithstanding all the precautions resulting from combined knowledge and skill, still patients would suffer, and pulps would die. This, of course, was due to the pathological condition induced by former irritation, which is so well portrayed in the evening's paper.

He thought that the effusion of serum confined by an impervious plug exercised that hydro-dynamic influence which so compressed the pulp as to preclude functional action within the tissue of that organ. He regarded the employment of plaster to prevent this as perfectly feasible, but had heretofore used cotton for this purpose, firmly packed in the cavity.

He desired to take this occasion to give it as good practice, in his opinion, to leave such partially decomposed dentine in the bottom of cavities, as by its removal would endanger the exposure of the pulp. He had adopted this course at the suggestion of Professor Arthur, some eight years since, and had proved the value of the treatment by repeated exam-

inations of cases, removing the plugs, not only for his own investigation, but in the presence of other practitioners. He found the dentine often discolored, and therefore not eburnated or ivory like, but, as had been suggested by Dr. Garretson, rather in a "vitrified" condition. Of course he had a fair per cent. of failures, but he had experienced a per cent. of successes so much greater that he could not permit any theorizing to have weight against so many facts as had come under his observation during the course of his practice. Recognizing the action of acidity in the removal of the lime constituents from the dentine, he always placed a very small portion of creta precip. in the cavity and plugged over it. Thought the chalk acted simply as an antacid.

Dr. Henry invariably removes all decomposed dentine from carious cavities, and if, under such circumstances, the pulp should be found exposed, he considered that it was the *decay* and not the *operator* that exposed it.

Dr. McQuillen dwelt upon the importance of a thorough knowledge of the anatomical characteristics of the different teeth, and in connection with the removal of deep-seated caries, gave illustrations of how ignorant or careless operators needlessly expose the dental pulp by not being familiar with the exact shape of the pulp cavity, and therefore not knowing when they might excavate freely, and when they should use their instruments with the greatest circumspection. He thought that the thermal influences to which the dental pulp is exposed, when a thin lamina of dentine only intervenes between it and a large gold filling, are the most prolific sources of trouble. Recurring to the objection which he had urged against leaving decay in a cavity, he said that he envied not the person who enjoyed the doubtful honor of first inaugurating this practice, for he believed that it had tended far more to countenance and encourage carelessness on the part of dental operators than any system or mode of practice that had ever been proposed. With regard to the benefits said to accrue from it, his experience of cases in which it had been tried by others was not by any means confirmatory of that, but just the reverse. A surgeon in amputating a limb, or excising a tumor, or other diseased mass, is careful to remove everything that would tend to develop disease in the adjacent healthy tissue, and the same principle and practice should control the dentist. His friends well know it was a principle with him to be exceedingly guarded in giving utterance to opinions which were in the slightest degree open to doubt, and under such circumstances that it was an invariable rule for him to advance his views *suggestively*; but in this matter he had no *doubts* of the tenability of his position, for his views were based upon an *experience* and *convictions* of many years' duration. In giving utterance thus *emphatically* and *decidedly* in opposition to the opinions of professional friends, for whom he entertained the highest respect, he fully recognized *their right* to *entertain, advance,*

and *practice* that which they conscientiously believe to be right; and to no one did he accord this more freely than to his esteemed friend, the distinguished author of the essay of the evening.

Adjourned.

NEW YORK SOCIETY OF DENTAL SURGEONS.

THE following was adopted, September 28th, by this Association, of which deceased was a member:—

Whereas, It has pleased God to remove from our midst our most estimable friend and professional brother, FREDERICK DIEFFENBACH; and

Whereas, The deceased, by his modest and unassuming manners, his amiable disposition, and his faithful efforts to secure that higher professional education, now recognized as essential to the competent dentist, has greatly endeared himself to us; therefore

Resolved, That we hereby express our great regret at this sad bereavement; that we tender our sympathy to the family of deceased, with a copy of this Resolution, and that copies be sent to the DENTAL COSMOS and *Dental Register* for publication.

WM. B. HURD, *President*.

CHAS. D. ALLEN, *Secretary*.

DENTAL NOTICE.

PURSUANT to notice, a meeting of the Dentists of Boston and vicinity was held on the 27th ult., at which a resolution was passed inviting Dentists to meet in Convention in Boston, at Mercantile Hall, Sumner Street, on the thirteenth day of October, at two o'clock P.M., for the purpose of completing the organization of the United States Dental Protective Union. Dentists are especially invited to attend.

N. C. KEEP, *Chairman*.

E. G. LEACH, *Secretary*.

DENTAL CIRCULAR.

Sir:—It is generally known that Dental Surgeons in the United States have for many years past been subjected to very many annoyances by claimants for various patents covering *parts* in the mechanical branch of our profession.

We have submitted to this state of things until forbearance ceases to be a virtue. We now propose to form a "Dental Protective Union," embracing all the Dentists of the United States, who shall pay the sum of ten dollars into the treasury, for a fund, to test and resist this *leeching process*, so long continued with impunity

It is a practical insurance against individual loss, from the persistence

of the numerous patentees whose claims are being thrust upon us, as we believe, most unjustly. It is quite apparent to any one that, individually, we cannot contend against the numerous claims presented, as the expense in litigation would be too heavy. But, by combining our interests, we can effectually resist all claims not well founded in law.

An organization is in process of formation, having for its government a Constitution and By-Laws, with active men in every State for its officers, who shall have the oversight of all matters pertaining to the interests of the profession as above indicated.

We ask your immediate and hearty co-operation with fellow-members of the profession, by sending your name and residence, accompanied by funds, to Dr. I. A. Salmon, temporary Treasurer of the United States Dental Protective Union, Boston, Mass., who will receipt you for the same.

It seems needless to appeal to the high and honorable motives, which should characterize our action in a matter of such individual, as well as collective interest. The funds collected will be invested so as to pay interest to the advantage of the Union.

I. J. WETHERBEE, Boston, Mass.,	} Committee.
N. C. KEEP, " "	
E. J. LEACH, " "	
S. MALLETT, New Haven, Ct.,	
W. N. MARTIN, Providence, R. I.,	

Boston, September 29th, 1864.

Boston, September 29th, 1864.

WHEREAS, it is expedient that a Dental Protective Union be formed, including all Dental Surgeons in the United States of America, for the purpose of mutual protection; therefore

Resolved, That we do hereby unite in associate capacity for mutual protection, and do agree to pay the sums annexed to our names, (which shall go toward admission fee,) and to comply with the Rules, Constitution, and By-Laws which shall emanate from said Union for its regulation and government.

NEW YORK SOCIETY OF DENTAL SURGEONS.

THE undersigned Committee of the New York Society of Dental Surgeons present the following list of subjects upon which essays will be read at the regular meetings of said Society, with names of essayists, and date of presentation:—

November 9th, 1864.—Anatomy of the Mouth. *Thomas Rowe.*

November 23d, 1864.—Origin and Formation of Teeth. *Wm. H. Atkinson.*

December 7th, 1864.—Pathology of the Teeth. *A. C. Castle.*

December 21st, 1864.—Physiology of the Teeth. *C. P. Fitch.*

January 4th, 1865.—Periodontitis. *A. L. Northrop.*

January 18th, 1865.—First and Second Dentition. *W. C. Horne.*

February 1st, 1865.—Artificial Dentures. *J. M. Crowell, John Allen, J. C. Robbins.*

February 15th, 1865.—Duties of private Dental Preceptors. *C. A. Marvin.*

March 1st, 1865.—Diseases of the Gums. *J. S. Latimer.*

March 15th, 1865.—Relation of Dentistry to General Medicine. *Wm. H. Atkinson, A. C. Castle, C. P. Fitch.*

March 29th, 1865.—Hypertrophy. *Wm. H. Atkinson.*

April 12th, 1865.—Cleft Palate. *N. W. Kingsley.*

April 26th, 1865.—Dental Etiquette. *W. B. Hurd.*

May 10th, 1865.—Diseases of Antrum. *J. S. Latimer.*

May 24th, 1865.—Filling Teeth with the Mallet. *G. A. Mills.*

June 7th, 1865.—Irregularities of the Teeth—their Causes and Treatment. *W. H. Allen.*

June 21st, 1865.—Dental Instruments. *Frank Abbott.*

July 5th, 1865.—Anæsthesia and Anæsthetics. *W. C. Horne.*

July 19th, 1865.—Dental Hygiene. *C. E. Francis.*

C. P. FITCH,	} Committee.
WM. H. ATKINSON,	
J. M. CROWELL,	

NEW HAVEN DENTAL SOCIETY.

At a meeting of the New Haven Dental Society, held October 15th, 1864, the following resolution was passed, ordered to be printed, and a copy sent to each dentist of the State:—

Whereas, We are frequently solicited to purchase dental patents, and to take out licenses to use patented articles and improvements on the same, the legality and validity of some of said patents being matters of doubt and dispute; and whereas agents of patentees threaten to stop our business by process of law unless we instantly comply with their demands, and whereas, we have good reason to believe that some dentists have been induced to yield to unjust requirements, paying money to sustain organizations not equitable nor reasonable; therefore

Resolved, That it is inexpedient for us to purchase the right to use any dental patent, the validity of which has not been definitely determined, and that it is eminently desirable that the action of the dentists of the State in reference to this matter should be unanimous and harmonious.

In view of the above resolution, and to secure your co-operation in the formation of a State Dental Association, which shall have power to act for our mutual benefit in this, as well as to promote the interests of the profession in all other matters, we would remind you of the call which has been issued for a meeting to be held in Hartford, October 20th, for the purpose of perfecting this organization, and respectfully urge your attendance.

EDITORIAL.

SENSITIVE DENTINE—ARSENIC, AND THE TREATMENT OF THE DENTAL PULP.

I REMARKED, in a note appended to my thesis, when it was published in pamphlet form in 1853, that the mutations through which the treatment of the dental pulp has passed, during the last twenty or thirty years, by many observers, and the apparent, unsettled condition of the subject now would not give any single one a very large share of credit for modifications or improvements up to the present time. I still hold nearly the same opinion at the present time of writing, but I do think that there ought to be more unanimity among well-informed dentists than there is, with regard to the best method of treating sensitive dentine and the exposed dental pulp. These differences of opinion are doubtless due to the fact that we have no settled standard of education among dentists; we have not a sufficient number of dental schools for the education of the young, in which the more fundamental principles of our art are taught. A young man can enter a private office, perhaps of a dentist, in full practice, where, from the nature of the case, he can receive but little attention, except to see the manipulations of his teacher; hence how impossible it is for him to learn anatomy, physiology, therapeutics, chemistry, pathology, etc., in their extended sense, to be able to lay hold of the proper principles to enable him to handle any organ of the human body with any degree of safety, to the well-being of his patient.

When all teeth were sacrificed that could not be managed by mere manipulations of the routinist or mechanic, such education was all-sufficient; but how different now, when an enlightened community demands more, and many intelligent patients known more, than the operators who attempt to treat their teeth! Can it be wondered that men differ? can it be a matter of surprise that those who are totally unacquainted with the properties of a deadly poison should get in trouble with it, when applying it to a living organ of the human body? And as those form, I am sorry to believe, the mass of the profession, yet can it be a matter of wonder that, when they meet with difficulty with it, they should cry out against its use?

I may be pardoned, in this connection, in stating that I received a letter, a few days since, from a young man in a distant and large city, inquiring of me whether it would be worth his while to attend a dental college to complete his education, adding that he was a good *workman*, and his teacher, who was a good man, and whom he liked very much, and he did not wish to do anything to offend him, opposed it, saying that he could take an office next spring, and practice for himself. He would then have time for study; but I should tell him all about it with regard

to the advantages he might derive from it. Could a deadly poison be placed in his hands? I think not; nor do I think it could be trusted in the hands of his teacher. There are many good men, in a social and moral sense, who are totally unfit for dentists, in a scientific sense. I am operating now for two patients—husband and wife—who have been in the hands of a good man in my own city; good in every relation of life, but woe to the dentistry that he has done for them! They suffered not only loss of valuable teeth, but pain incalculable; the spell he held over them, because he was a good man, broke at last, and, with reluctance, they sought advice elsewhere. Every man ought to be good, in a moral sense, but he must not forget that he must exert himself to be a good dentist. The profession is not ready yet for the highest order of dental practice. There is too much diversity of opinion in relation to dental physiology and dental pathology; too many men refuse to acknowledge a standard of education; too many have succeeded with limited knowledge, and regard a departure from that as an innovation; and if their time is filled with operations, it is a sure guide for them that they know all that is worth knowing in the profession, and all that is required of them at the hands of an enlightened community. J. D. W.

(To be continued.)

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

OHIO COLLEGE OF DENTAL SURGERY.—The Annual Announcement of this institution for the session of 1864–5 has just come to hand. Owing to the resignation of the late professor of Mechanical Dentistry, a vacancy was created, which has been most judiciously filled by the appointment of Dr. J. Cheasbrough, one of the most promising, studious, and indefatigable workers in our profession. The other chairs are ably filled. The infirmary and laboratory, it is stated, have been refitted with all necessary appliances for the operative and mechanical department.

DR. NORMAN W. KINGSLEY.—This gentleman started for Europe, on the 29th of October, with the view of bringing his ingenious and perfect artificial palate under the notice of the dentists, surgeons, and men of science generally in England and France. There can be no question that his invention will receive what it so justly merits, the most unqualified commendation on the part of those who may have an opportunity of examining it, particularly if they should see it applied in some unfortunate case of cleft palate. The best wishes of his friends accompany him in his trip,

and that it may prove alike pleasant and profitable to him and to others. We would bespeak for him, on the part of transatlantic professional gentlemen, the cordial welcome which his valuable improvement fully entitles him to.

THE PORT HOPE GUIDE—AUGUST.

"DEATH BY CHLOROFORM—THE CORONER'S INQUEST.—On Monday afternoon last, Mrs. Beulah Robinson, widow of the late Mr. Robinson, of Port Hope, died while under the influence of chloroform administered to her by Mr. George Chambers, in the office of Messrs. Waid & Natrass, dentists in this town. The deceased lady had gone to the dentist to get a number of teeth extracted, and insisted on taking chloroform, in order to avoid the pain—which she said she could not bear. Mr. Waid was opposed to giving the chloroform, but having confidence in Mr. Chambers' knowledge of medicine, and trusting to that gentleman's experience in administering chloroform, he allowed it to be applied. Mr. Chambers has practiced dentistry, and has frequently used chloroform; he has also studied medicine, and attended College at Ann Arbor for that purpose. Chloroform was administered to her some four or five times; but between each time she recovered sufficiently to ask for more chloroform. Nine teeth were extracted—seven by Mr. Chambers, and the last two by Mr. Waid. Death ensued very soon after, notwithstanding the attempts that were made to restore her. We have been assured that the clause in the evidence referring to the length of time from the first exhibition of chloroform, till death, is not correctly reported; but that the whole operation did not last over thirty minutes. The sad event has been a source of deep regret to the whole community. On Monday evening an inquest was held on the body by Robert Maxwell, Esq., Coroner, in the Council Room. The following gentlemen composed the Jury: Mr. A. Sands, *Foreman*, Messrs. Robert Orr, R. S. Howell, James Curry, H. B. Hales, William Pillow, J. Leet, W. H. Braund, T. Earl, Jacob Hoffman, W. Chislett, Henry Ireland, Samuel Hastings. The following is the evidence in the case:—

"Clarissa Hawkins, wife of Nicholas Hawkins, sworn.—I went with the deceased to the office of Mr. Natrass, dentist, about three o'clock this afternoon. The deceased told me, and told the dentist, she wished to have chloroform administered before having some teeth extracted; she said she could not stand the pain without chloroform. She was not insensible at any time; but knew what we were talking about. The chloroform was inhaled from a handkerchief, which was removed at intervals. She wished for more. It was removed several times, in order that she might breathe the atmospheric air. She was sitting when it was administered. The dentist commenced a little after three o'clock; she died at about four o'clock. She did not inhale it more than five times; inhaled it before any teeth were taken out; never took enough to make her insensible; the first time she did not inhale it more than ten minutes; she inhaled it four or five times after; but between each operation she recovered so as to speak to the operators, after which she was still anxious to keep inhaling. Mr. George Chambers was the person who gave the chloroform; he extracted seven teeth; Mr. Waid extracted the two last; the reason was, Mr. Chambers was anxious that Mr. Waid should try his own forcep. I think she inhaled chloroform immediately before Mr. Waid extracted the last two teeth.

Thinks Mr. Waid would have advised not taking the chloroform; but after two or three of the teeth were extracted she could not bear the pain without. Mr. Chambers asserted he had administered it many times. Immediately after the last abstraction she fainted and died away. Mr. Waid called for liquor; he administered ammonia at once out of a bottle, but it had no effect. Thinks the liquor was whisky. She was kept in a sitting position as long as we could, but was afterward partially laid on the floor, but leaning against a chair. Witness suggested sending for some doctor. They said send for Dr. Curry, but I met Mr. Perry and he went and got Dr. Griggs, who arrived the first, and Dr. Curry afterward. Mr. Chambers and Mr. Waid kept feeling her pulse occasionally; they were under the impression there would be no danger. Mr. Chambers and Mr. Waid, after she was dead, were much alarmed, and thought it a dreadful affair. I stopped until the body was removed. The bottle containing the chloroform was a three or four ounce bottle; thinks it was not full when he commenced the operation, nor empty when he ended. I think the deceased was about twenty-six years of age. She was not well for a long time. I am not aware that Mr. Chambers knew she was in such a delicate state of health.

*"Charles D. Waid, dentist, sworn.—*I am a dentist in partnership with Mr. Natrass. I came into the room before any of the chloroform was administered. One day last week Mr. Perry came first, and she came after, and I tried to persuade her to have them taken out then. I told her at that time I should not administer it without a physician as an assistant, and I told her she was not in a position to take it then. She then made an appointment with us at ten to-day. Her friends also advised her not to take it. She told me to-day she eat no dinner, only a light breakfast of oatmeal pudding. I believe it is better to administer it on a light stomach and a fine day. Mr. Chambers has practiced as a dentist, and professes to have studied physic, to what extent I do not know. I never saw any person administer chloroform in Port Hope. I sent Mr. Chambers for the chloroform, and told him to get the best. I should think the bottle was about a four-ounce bottle, about half full. I never saw Mr. Chambers administer it before. I think about one-half of the chloroform was wasted during the extracting of the teeth. She appeared to be sensible and strong at the time I extracted the last two teeth. Mr. Chambers extracted seven teeth before I extracted the last two. I don't think she bled as much as would have weakened her much. She said herself she could not have stood the pain without; but still I did not advise her to take it, never advised any one to take it. Her pulse was about 30 to 40 beats in a minute at the time. Mr. Chambers did not exhibit any fears or apprehension at the time. I did not hold my watch at the time I felt her pulse. I am accustomed to feel the pulse of persons, and think I could judge correctly of its frequency. Mr. Chambers felt her pulse several times. I had full confidence in Mr. Chambers to administer chloroform—from his knowledge of medicine, and also from the great number of times he told me he had administered it at the College in Ann Arbor, Michigan, and from the numbers of patients who have been in our office since I came here, and told me of his having administered it to them with good success. Chloroform has not been used in my office during my time before. We used cold water to restore her; also had all the windows and doors opened. Perhaps it was three minutes from the last exhibition until death. Mr. Chambers held her by the hands during

the extraction of the last tooth. She made a noise when the last tooth was being extracted, the same as a person would if a tooth were being extracted without chloroform. After the last tooth was extracted, we told her to spit; she leaned her head over the bowl held by Mrs. Hawkins, to spit, but was not able to raise it again. I held her tongue out just after she leaned her head over. We moved her arms up and down by taking hold of her hands, immediately. I was present at the time he gave her the last chloroform, but did not think she was in danger. I had spoken to Dr. Curry to come to administer the chloroform to her. I told him that I would let him know when she came, as it would not be certain, though I expected her at 10 o'clock on Monday; but she did not come until afternoon, and Mr. Chambers being unexpectedly present, I told her that if she wanted to take it, Mr. Chambers would give it to her, as I understood he was a good hand to administer it.

"Dr. Griggs, sworn.—I am not prepared to give evidence in this case until there is a *post-mortem* examination. There is something very mysterious in this case; but I cannot tell whether there was disease of the heart or not, until I make an examination, after which I shall be able to say. Mr. Libby went for Mr. Curry; Mr. Perry came for me. I arrived there within ten or fifteen minutes after she expired, and there was not the least symptom of any pulsation of the heart. I have seen some thousand of cases of administration of chloroform, but think there is something mysterious in this case.

"Horace Perry, sworn.—The deceased is a full cousin of mine. She was stopping at my place. Was in a rather delicate state of health; she did not say what ailed her, but complained of a pain in her side occasionally. She expressed a wish to have her teeth extracted, and sent me to the office to see if they could attend to it. She thought she would have to take chloroform. I discouraged it all the time. Mr. Waid also advised her not to. I did not see Mr. Chambers, and did not know he was there.

"Dr. Curry, sworn.—I can say I saw the deceased, and after a thorough examination, found the pulse had left the wrist, the arteries had ceased to beat; and upon ascertaining that life had ceased to exist so soon, I at once formed the opinion, and became more thoroughly convinced, after examining the body in the evening, that no medical man could give correct evidence in the case until there was a *post-mortem* examination of all the internal organs of the body, after which I am prepared to give further evidence in the case.

"Dr. Cameron, sworn.—I have heard Mrs. Hawkins and Mr. Waid, and should think from their evidence that there must have been a good deal of care, and to a person in good health the manner in which it was administered would have been safe. It is necessary to use the greatest care in using chloroform, and the person administering should not take the finger off the pulse while administering it; it is also recommended where there is any supposed disease of the heart, it ought not to be used. In all cases of restoratives no fluids should be used. One of the first restoratives to be used is to pull the tongue out, artificial respiration, and place the person in a horizontal position, where there is a free circulation of air, and remove anything tight round the body; the use of galvanism is also of great service. No person should administer chloroform without knowing the state of the patient's health, or under the guidance of a proper medical practitioner. A medical man, as a general thing, can tell if a person is capable of taking chloroform with safety.

"Dr. Perks, sworn.—I have heard the evidence of Mr. Waid and Mrs. Hawkins, and consider that the deceased died from the ordinary symptoms of poisoning, by the inhalation of the vapor of chloroform.

"Cross-examined.—I believe that chloroform might be, or would be likely to be administered in a manner similar to that in which it was given to deceased by George Chambers, by a skillful physician—so far as the mere administration was concerned—always provided that a proper preliminary examination was made. I believe the administration of chloroform to require the exercise of good judgment, and a most careful preliminary examination of the patient by a well-qualified physician. I do not think the proper restorative measures were used in an efficient manner for the benefit of deceased, after insensibility and danger occurred.

"Dr. Cameron cross-examined by Mr. Thomas Benson.—I have known the deceased a number of years—she was a delicate person. I believe that death was caused by a cessation of the action of the heart, brought on by exhaustion and from the length of time she was under the influence of chloroform. I would not have administered chloroform under any circumstances to the deceased.

"Dr. Evatt, sworn.—The first thing in the administration of chloroform is to ascertain the state of the patient—if they are in a fit state to take it. When it is decided the patient is able to take it, is to take care to have a sufficient quantity of atmospheric air to be inhaled with the chloroform. From the manner chloroform was administered here, there must have been a sufficiency of atmospheric air. I don't conceive there was any error in the mode of exhibiting it. There must have been some defect in the constitution of the patient. I think it is a very improper thing that dentists should exhibit chloroform to their patients, yet, as it is often done by dentists, I do not blame the young men in this case. I think the cause of death was by the poison of chloroform on an exhausted patient. It is a pity that artificial respiration was not used. I have no great fault to find with the means used to restore the patient. They might have been better; but, under the great confusion consequent upon such an accident, I think the means adopted were pretty fair. I think the young man ought to be treated with a great deal of lenity both by the jury and the public.

"George Chambers, sworn.—I have administered chloroform about 78 times without any ill effect. I was six months at college—Ann Arbor College, Michigan—and I studied a year with Dr. Curry before I went there. I hold a certificate from the college. I went through a course of regular instruction at that college. I was not acquainted with this person before.

"The following is the verdict as rendered by the jury:—

"That Beulah Robinson came to her death by chloroform at the office of Waid & Nattrass, administered by George Chambers, assisted by Charles D. Waid. Your jurors wish to express their disapprobation to the giving of chloroform by disqualified persons. The jury consider that no person ought to be allowed to administer chloroform except a physician."

THE PEOPLE'S DENTAL JOURNAL—JULY.

"CLEFT PALATE.—*Messrs. Editors:*—Having lately enjoyed somewhat extended opportunities for observation upon a certain class of cases which occasionally present themselves to us for treatment, and as there will probably be an increase in their number, particularly among our soldiers, owing

to gunshot wounds, necrosis, and sloughing of the parts from the effects of adjacent injuries, etc., etc., I will, at your request, give you the result of my observations, thinking that it may possibly be of benefit to some of the numerous sufferers from this cause.

"The affection to which I allude is cleft-palate, and it is well known to all who have ever attempted to converse with persons in whom this deformity exists, that it is with difficulty that they can be understood, and, indeed, some are incapable of making themselves understood at all, save by their family and more immediate friends. For a long time, these sufferers were doomed to banishment from society, and in many instances to almost total seclusion, their cases being considered hopeless. But eventually, a surgeon named Roux succeeded, by means of an exceedingly tedious and somewhat painful operation, in so ameliorating the condition of the least deformed of them, as to cause his operation to be generally adopted in surgical practice. During this operation, the patient was forbidden any solid food, or the use of speech, or the act of swallowing, or motion of any kind, save what was inevitable, for days together—sometimes for weeks; and after all this, the operation, so far as has been ascertained, has never been a complete success, but has only been an improvement, often only a slight one, sometimes none at all. Afterward, an instrument called an obturator was occasionally constructed and inserted by the dentist, which was applicable in many cases where the operation could not be performed; but it was never very generally adopted, for, practically, it fell far behind the desideratum. Within the last few years, improvements have been made on this system, both in France and Belgium, by the substitution of soft rubber for metal, in the construction of these instruments; and finally by constructing a soft flexible curtain, in some particulars resembling the natural velum, (or soft palate,) and attaching this so as to cover the opening, and yet not interfere with the motion of the muscles of the throat and palate.

"I sought out and examined many of these patients; listened to their speech with the artificial velums in place, and also with them out; examined them, both as to their adaptation and construction; and, although the improvement was most marked, still the appliance bore the stamp of imperfection. I saw and conversed at length, and many times with the operators in these cases, and more particularly with one to whom many of the French surgeons more often refer their hospital and other patients than to any other, and although he exhibited to me models of probably more than a hundred cases of various sorts, explained to me his mode of operating, and showed me a multitude of pieces of ingenious mechanism, I was unable to find any apparatus that exactly accomplished the desired object. To render myself comprehensible to the non-professional as well as to the professional reader, I will here say, that the indications to be fulfilled are these: an obturator, or covering for the cleft, which shall be perfectly adapted to the muscles against which it is to lie; shall be flexible—susceptible of all the motions of the velum, or soft palate itself; shall be durable; easily detached and replaced by the patient; and, in a word, shall be so under the control of the surrounding muscles when *in situ*, that the patient have the power, which in a normal state he would possess, of directing the voice at will, either through the mouth or the nasal cavities, or both, as desired.

"I found nothing, however, in Europe, which so completely answered these indications as an artificial velum constructed by Dr. N. W. Kingsley,

of New York. I spent the greater part of several days in his office and laboratory, going over the manipulations in the different steps of the process, discussing the points which had been developed, and the difficulties which had been overcome, seeing and conversing with his patients, and carefully examining the appliances in each of their cases, and, as before stated, for the first time found the indications that I have enumerated above, fulfilled in actuality, certainly with trouble and toil, and at the expense of a vast amount of patience to the operator, but without pain to the patient, with the certainty of benefit, and with the prospect, in most cases, of a complete cure. Beyond all this, the remedy is available for the worst cases that have thus far presented themselves, as well as for all ordinary ones, and the improvement in speech commences in some instances almost at once. Dr. Kingsley would seem to be most eminently entitled to the praise so fully awarded to him by the members of the profession for his invention.

E. A. BOGUE, M.D.

CHICAGO, July, 1864."

DENTAL TIMES—OCTOBER.

THE second number of the second volume of this magazine has been received, and contains several articles of interest to the profession. As the writer remarked elsewhere,* over a year ago, in speaking of this journal: "There is *room* enough and *need* for all that can be done in behalf of dental education and dental literature. The field is large, and, to a great extent, uncultivated, and capable of yielding an abundant harvest. The more avenues, therefore, that are opened, whether they be *colleges* or *magazines*, by which *light* and *knowledge* shall be diffused, the better."

The accompanying extracts are from an article on CAOUTCHOUC, by Prof. E. WILDMAN.

"In forming hard rubber, it is essential that sulphur, or sulphur in combination with some other substance, should be incorporated with caoutchouc. To this base is frequently added earths, metallic oxides, shellac, resin, pitch, bitumen, saw-dust, charcoal, etc., for purposes of utility or economy, for articles of commerce, and some of the compounds vended for dental purposes are so loaded with earths, or metallic oxides, as to render them unfit for the use they are ostensibly designed.

"As the manufacturers of hard rubber compound are so very reserved as to its composition, little information can be gleaned as to its ingredients or proportions, except from their specifications of patents and from experiments. During the past year, I have made numerous experiments in making hard rubber compounds, some of which have been successful, and in due time will be given to the profession. * * * *

"Owing to the press of matter, I am unable to give, in the present number, the results of the experiments to ascertain the quantity of solid or earthy matter in the different samples of rubber offered for dental purposes; but I will here remark, in *all* of the samples of English pink rubber, I have found *forty-eight per cent.* of earthy matter—a quantity sufficient to render it so weak as not to be reliable for dental purposes."

* Report of the Committee on Dental Literature, submitted by J. H. McQUILLEN, D.D.S., Chairman, Transactions of the American Dental Association, page 97, Session 1863.

LONDON DENTAL REVIEW—JULY.

"THE DEVELOPMENT AND OSSIFICATION OF THE SUPERIOR AND INFERIOR MAXILLARY BONES. By ROBT. T. HULME, M.R.C.S., F.L.S.—The formation of the antrum is intimately connected with that of the alveoli. It has been previously mentioned, that toward the end of the second month the lachrymal piece becomes ossified. This lachrymal piece (Figs. 1 and 2, *e*) is a thin scale of bone, whose upper surface is smooth, and forms part of the floor of the orbit; its external surface is slightly convex, and assists in forming the infra-orbital canal. The internal surface which looks toward the nasal fossa is somewhat concave, and it is this concavity which constitutes the origin of the antrum. The inferior surface corresponds to the bottom of the sockets of the molar teeth, but from the third month the laminae forming this piece become separated by a mass of spongy tissue, a kind of diploe which is deposited in their interstice. It is in this tissue that the teeth of the second dentition form small cavities for their reception. At first, the floor of the orbit reposes directly upon the socket of the second temporary molar, but afterward a space begins to form between the floor of the orbit and the socket, and when the child is a year and a half old this has acquired the depth of two-thirds of an inch; and when the socket of the second temporary molar has become closed posteriorly, there is a space between the floor of the orbit and the alveolus of rather more than an inch. It is in this space that the antrum becomes hollowed out, and that the germs of the second teeth are developed. At the commencement of the third month, when the lachrymal piece begins to be developed, the antrum is only represented by a simple depression which arises from the concavity presented internally by the lachrymal piece. This small concavity becomes a hollow space, which increases in depth in proportion as the floor of the orbit is separated from the alveoli.

"At first the lachrymal piece forms an inclined plane looking outward; in proportion as the spongy tissue is deposited this piece separates from the bottom of the alveolo-dental groove, but its external border becomes more elevated and assumes a horizontal position, while the rudimentary cavity of the antrum increases in dimensions both in a vertical and horizontal direction. After the eruption of the permanent teeth, the space which they occupied is in part occupied by the antrum. Up to this time the antrum is widely open internally; the vertical portion of the palatine piece forms its internal wall anteriorly; posteriorly it remains open. The malar piece assists only at a late period, and then only slightly, in the formation of the antrum.

"This description does not differ materially from the account which M. Guillot gives of the formation of the antrum in his most original and valuable 'Researches on the Origin and Development of the Teeth and Jaws,' published in the *Annales des Sciences Naturelles* for 1858, and of which a translation appeared in the *Dental Review* for 1859. This writer says: 'In the upper jaw, the bone which forms the osseous capsules of the permanent molars is deposited in the interval, situated between the summits of the alveoli of the first dentition and the floor of the orbit.'*

"In the same paper the gradual formation of the antrum is traced up to the period of the second dentition, and measurements given of the

* See *Dental Review*, vol. i. p. 532, 1859.

depth which separates the floor of the orbit from the sockets of the molar teeth.*

"Soon after the eruption of the wisdom teeth, the development of the superior maxillary bone is completed, and the antrum attains its full dimensions. The further changes which the bone undergoes depends upon the condition of the teeth. As these are lost so their sockets are absorbed, as no longer of any use, until, in the edentulous subject, the alveoli are entirely removed, and their place occupied by an obtuse ridge of bone, which rises but a short distance above the level of the palate. I am not aware that any observations have hitherto been made upon the effects of age in altering the form and dimensions of the antrum, nor is the influence probably great. But, inasmuch as the gradual loss of the teeth must be attended by corresponding alterations in the dimensions and attachments of the muscles of mastication, so these changes in the muscles must involve a certain amount of alteration in the bones to which they are attached. In the case of the superior maxillary the alterations which are thus produced on its external surface are probably accompanied with some slight change in the form and dimensions of the antrum, but these must be so slight as to be of no practical importance. In respect to the pathological changes to which the superior maxillary bones are liable, it may be briefly stated that this bone is most liable to disease in early and middle life, and that when it shows itself at a later period it has in most cases commenced long before. Thus, in a 'Report on Tumors of the Jaws and their Operative Treatment,' in the *Medical Times and Gazette* for September 3d, 1859, out of twenty-four cases only nine were over forty years of age."

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"OBITUARY NOTICE. SAMUEL CARTWRIGHT, ESQ., F.R.S.—Mr. Cartwright died June 11th last, at his residence, Nizell's House, Tunbridge Wells, aged seventy-five.

"For a long series of years this well-known practitioner enjoyed the confidence and support of perhaps an unprecedented number of patients, including very many persons of the highest position; and it is with satisfaction that it can be said, now that he has departed from among us, that such confidence was well placed, for Mr. Cartwright was certainly a skillful operator. He understood his work, performed it carefully, and therefore successfully.

"In the course of his life how many acts of liberality in the exercise of his calling were extended to persons requiring his services, but not too well off in this world's goods, will never be known, but we have reason to believe they were many: while his consideration for members of the musical and other professions was notorious. Mr. Cartwright's hospitality will not be forgotten by those living who have shared in it. It was extended to all ranks and callings, promoting a large amount of good feeling. A man possessed of the entire confidence of an unlimited number of patients, from royalty downward, and at whose table might periodically be found

* I must here remark, that following the estimate given in the first edition of Quekett "On the Microscope," of the value of the millimètre in English measurement, the one-three-hundredth of an inch was taken as its equivalent. This is incorrect; but if 25 is used instead of 300 as the denominator of the fractions, those measurements will be correct, and will not be found to differ very materially from those given above from MM. Rambaud and Renault's work.

distinguished persons in various positions of life, more especially in the arts and sciences, must be accounted a man of mark in his generation; and such was undoubtedly the late Mr. Cartwright. His name was familiar as a household word, and it seems almost difficult to realize the fact of his being here no more.

"Some years before the close of his professional career, we believe Mr. Cartwright was joined by his nephew, the late Mr. Durance George, in the conduct of his practice; that subsequently Mr. George undertook the entire practice till his death, upon which event Mr. Cartwright again entered upon the duties of his practice, assisted by his son, Mr. Samuel Cartwright, jun., and that he finally retired into private life not many years ago, being worthily succeeded by his son.

"Mr. Cartwright was the first President of the Odontological Society. It told well for his interest in the Profession that he should consent to take his post at so advanced an age, and after the hard work of his previous life."

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BRITISH JOURNAL OF DENTAL SCIENCE—SEPTEMBER.

THE following extracts are presented through the politeness of Mr. Wm. H. Waite, of England, who kindly loaned to me a volume of the Transactions of the Odontological Society of Great Britain, and the September number of the *British Journal of Dental Science*. It is somewhat singular, that although willing to make extracts from the DENTAL COSMOS, the *British Journal* should neglect to forward the magazine in *exchange*, and also to invariably give the name of authors when republishing their pieces. The highest compliment which can be paid a writer, is to quote his language; to do this without due credit to him, as well as to the magazine from which an article is taken, though no doubt unintentional, is neither an act of justice nor generosity to him. A review of the Transactions of the Odontological Society will be presented in a subsequent number.

"THE PATHOLOGY OF DENTAL CARIES. By W. K. BRIDGMAN, L.D.S.—Were the various facts in electro-pathology as palpable as the dissolving of sugar in hot water, it would not have remained till the middle of the nineteenth century to have them first brought into notice; and when Mr. Bate suggests the probability of his carrying with him 'the majority of our dental physiologists in the less arbitrary conclusions' to which he has arrived, I agree with him most fully, and for this reason—a *special course of education in a particular branch* is needed to be able to understand and appreciate the minute distinctions and delicate appearances which constitute the very essence of the science. It is not a general acquaintance only with the subject, such as can be obtained in the ordinary course of one's reading, but a long and patient study of facts in all their bearings, that is essential to their comprehension; and as this is not likely to have formed part of the study of the physiologist, it would be unreasonable to expect many converts among the present generation of dentists, or that they should give in their adhesion to a theory the principles of which, it has been avowed, they are yet 'hardly up to.' A few years back I should myself have been inclined to agree with Mr. Bate in

his views of chemical action, etc., but meeting with an article in the 'North British Review' on the theory of Professor Grove's on the 'Correlation of the Physical Forces,' I was sufficiently interested to procure the work itself, and was well compensated by finding an entirely new channel of investigation opened up. The theory then broached is gradually working a complete revolution in all matters relating to the consideration of the physical forces, and is clear upon one point upon which Faraday does not appear ever to have been very decided, and that is, the relationship of electricity to chemical action. It had long before been seen that chemical action was always accompanied by the development of electricity; but again, on the other hand, as electricity was also found to produce chemical action, it could not be said that either one or the other was able to claim precedence in the matter, and as we find electricity developed in so many ways where chemical action has not been detected, as, for instance, in hydro-electricity, where, as Mr. Smee observes, 'the friction of the steam against wood gives rise to the electric force,' and again, in magnetic electricity, the idea of chemical action as the cause of electricity has consequently been abandoned. It is now seen that they are equal relations, in common with all the physical forces, any one of which may become merged into any one or more of the others, and that they both are the effects of a prior organization of matter:—of a natural inherent condition of matter, of which, when portions in opposite states of static or dormant electricity come together under certain circumstances so that they can unite, chemical action and electricity are developed, and frequently also both heat, light, and motion in addition. Each one of the forces may, likewise, make manifest any other, or all the forces, so that no one can be said to stand as the originator, unless it be the light from the sun, which is capable of developing all the rest. If we choose to shut our eyes to these facts, and the deductions to be made from them, we shall make but little advancement upon the knowledge of our predecessors. I will not attempt to combat Mr. Bate's views further than offering this explanation of the basis upon which my own views are founded, and to which, in a full explanation, I hope soon to be able to refer the reader. There are several points, however, that I feel desirous of noticing, and I must say that I think had Mr. Bate read my questions with the view of ascertaining their exact meaning, he would scarcely have given the replies he has.

"1st. I was under the impression that decay, let it commence in whatever part of the tooth it may, invariably destroys first all the crown, or enamel-covered part of the tooth, and that a decaying cavity at the neck does not extend into the fang as it does into the crown, but cuts off the latter level with the gums, and that the 'ends' were caused not by the acid corroding them down, but by their elevation in consequence of the absorption of the alveolus, and their abrasion and destruction consecutively, as the surface was brought to the level of the gums. Such, at least, is the belief I have gained from experience.

"2d. The decay in a pivot hole I believe to be due more to the action of the pivot itself. With regard to the perforation of a denuded fang decaying faster than one in the crown, I have seen, within the last few days, one in an upper cuspid made by myself more than seven years ago, as perfect as the day it was done, and I meet with such not unfrequently; but with respect to the protection afforded by the periodontum—its

presence is a coincidence, but affords no proof—its protection must be only surmised under any circumstances.

"3d. If Mr. Bate has not specially experimented upon the electro-removal and depositing of lime, I can only say it would amply repay for the time expended in studying the action and its results. A clear and colorless solution like the saliva does not throw down its salts of lime, except on evaporation, which is little likely to occur in the mouth, or else by some compulsory force. And with regard to the two kinds of decay differing only in degree, this can scarcely be accepted as an explanation of such marked difference in appearances, in results, and in chemical constituents."

"ON CLOSURE OF THE JAWS BY CICATRICES. By Dr. AZAM.—(Translated from the *Journal de Médecine de Bordeaux*.)—The *Dublin Quarterly Journal of Medical Science* of May, 1863, contains an interesting article by Mr. Heath, of Westminster Hospital, upon a modified operation which has been successful in two cases of closure of the jaw from cicatrices,* and which may be useful in similar cases. Mr. Heath records three cases: in the first, for an ankylosis following necrosis, he successfully performed Esmarch's operation, which consists in the creation of a false joint by resection of a wedge of bone from the lower jaw. In the second case, which was of a similar nature, but complicated by adhesion of the cheek to the jaw, and by adhesion between the upper and lower jaws, Mr. Holt achieved a satisfactory result without the employment of resection. He separated the cheek, broke through the adhesion of the jaws, and, by a mechanical contrivance, he favored the reproduction of the mucous membrane. In the third case, which was of a much more serious nature, Mr. Heath employed a similar method, and obtained a remarkable success.

"I think it will be as well, for the clear understanding of that which follows, to enter into some details as to the theoretical indications, and the modes of performing these operations.

"It is not uncommon to meet with patients who are suffering from the sad infirmity known as ankylosis, or closure of the jaws from cicatrices. The cause of this closure, in all its varieties, is nearly always the same, viz., chronic inflammation, with suppuration or loss of substance, in the cheek or lips, or necrosis of the jaws. This inflammation leads to cicatrices or adhesions; it may be between the jaws; or between the cheeks and the jaws; or, lastly, in both situations together, when the patients suffer from a very serious infirmity.

"To say nothing of the repulsive appearance, their lives are endangered from want of sufficient nourishment, and this state of things may become so serious that attempts for its improvement, however bold they may appear, must be considered as perfectly legitimate.

"The anatomical position of the parts may vary considerably. In some cases there will be complete bony ankylosis between the jaws, or of the two temporo-maxillary articulations; but this is, I am bound to say, a very rare complication, for experience has shown that adhesions between the jaws continued during many years, very rarely lead to this union. In

other cases, a cicatrice of the cheek, the result of gangrene, a wound, etc., will have led to closure of the jaws, the cicatrice being sometimes adherent to the gums or to the jaws, either near the commissure of the lips or in the deeper parts of the mouth. Occasionally, too, the jaws themselves will become adherent together, being bound by fibrous tissue, or even by plates of bone.

"In all these cases the surgeon will have to determine the mode of operating most applicable to each. We will proceed to examine the several plans which the study of these forms of disease has given rise to.

"It is well known that for many years surgeons attempted to remedy the affection which we are now discussing by dividing the bands which maintained the adhesion between the two jaws; for the most part, that is, in cases where the temporo-maxillary articulations were not ankylosed, the patients experienced immediate relief, and the jaws were separated; but, as the powers of cicatrization went on, the bands were reproduced, the adhesions grew again, and after a time, which varied from three weeks to six months, the affection was reproduced, and often worse than at first. In order to obviate this result, wedges of wood and screw-apparatuses were employed, but without success. In 1839, Dienlafoy, of Toulouse, divided the masseter. In 1841, Carnochan, of New York, divided the same muscle, proposed tenotomy of the temporal muscle, and suggested the proceeding of Esmarch. Dieffenbach had also spoken of it in his 'Operative Surgery,' but its want of success had been so great, that this method had been almost entirely abandoned, when a Danish surgeon, Esmarch, put in practice the operation which now bears his name.

"The history of this operation is very interesting, but it does not form part of my plan to enlarge upon it. I will refer the reader upon this matter to the excellent essay of M. Verneuil, published in 1860, in the *Archives*; to the discussions of the Society of Surgery; and to the articles in the *Gazette Hebdomadaire*. It will be sufficient for me to say that the formation of a false joint in the lower jaw, in order to remedy closure of the mouth, is effected by two methods: one, that of Esmarch, which consists in exercising a wedge with the base downward in front of the adhesions; the other which consists in making, at the same point, a simple section of the bone. In that of Esmarch, the false joint has for its basis the fibrous tissue of new formation, which occupies the space left vacant by the resection. In that of M. Rizzoli there is not, properly speaking, a false joint at all. The two ends of the bone being maintained apart by a foreign body inserted between them, or by appropriate movements, a mucous membrane continuous with that of the mouth forms upon the cut extremities, and the success of the operation is afterward certain. The formation of this new mucous membrane is the most important point; it is the end to which the operation should tend, and it is that which, in my opinion, gives a marked superiority to that of Rizzoli over that of Esmarch. However much, in fact, the fibrous tissue which one endeavors to produce in the latter operation may stretch, it has an invincible tendency to contraction. These proceedings known abroad, put in practice in America, in Denmark, and in Italy, have only been introduced into French surgery by the efforts of M. Verneuil, who was the first to make them known, and who has excited discussions upon the subject at the Chirurgical Society. I am bound to say that notwithstanding the well-known skill

of the surgeons who have employed them—it will be sufficient to mention the names of MM. Huguier, Boinet, Verneuil, Marjolin, Bauchet—this method has hitherto been unsuccessful in France. The last case was operated on by M. Boinet, 28th June, 1863, by Esmarch's method, Rizzoli's operation having already failed from I know not what cause.

"This want of success, though well established, is far from making me think that these proceedings, and especially that of M. Rizzoli, are not worthy of our earnest attention. The successful cases of this surgeon are undoubted, and are several years old now. I believe, therefore, that there is room for the study of the details of the operation, and that the insertion of foreign bodies between the surfaces of bone ought to be insisted upon above all things, in order to favor the formation of mucous membrane rather than a fibrous union. It is precisely these details of execution, and the excessive care exercised to favor the formation of mucous membrane, which give character and interest to the observations which I am about to translate. In neither case has the surgeon endeavored to form a false joint, but has brought to perfection the old mode of treatment, the division of bands and adhesions, and has arrived at most happy results."

"CANDIDATES FOR THE CERTIFICATE OF QUALIFICATION IN DENTAL SURGERY.—We are so constantly receiving inquiries as to the requirements of the Dental Board of the Royal College of Surgeons, that we reprint the following:—

"I. Candidates are required to produce the following certificates:—1. Of being twenty-one years of age. 2. Of having been engaged during four years in the acquirement of professional knowledge. 3. Of having attended, at a school or schools recognized by this College, not less than one of each of the following courses of lectures, delivered by lecturers recognized by this College, viz.—Anatomy, Physiology, Surgery, Medicine, Chemistry, and Materia Medica. 4. Of having attended a second winter course of lectures on Anatomy, or a course of not less than twenty lectures on the Anatomy of the Head and Neck, delivered by lecturers recognized by this College. 5. Of having performed Dissections at a recognized school during not less than nine months. 6. Of having completed a course of Chemical Manipulation, under the superintendence of a teacher or lecturer recognized by this College. 7. Of having attended at a recognized hospital or hospitals in the United Kingdom the Practice of Surgery, and Clinical Lectures on Surgery, during two winter sessions. 8. Of having attended at a recognized school two courses of lectures upon each of the following subjects, viz.—Dental Anatomy and Physiology, (Human and Comparative,) Dental Surgery, Dental Mechanics, and one course of lectures on Metallurgy, by lecturers recognized by this College. 9. Of having been engaged, during a period of not less than three years, in acquiring a practical familiarity with the details of Mechanical Dentistry, under the instruction of a competent practitioner. 10. Of having attended at a recognized Dental Hospital, or in the Dental department of a recognized general hospital, the practice of Dental Surgery during two winter and two summer sessions. N. B.—The students of the London schools are required to register the above certificates at this College, and special returns will be required from the provincial schools. The fee for the certificate of fitness to prac-

tice as a Dentist is ten guineas, over and above any stamp duty. Members of the College will be examined only by the Section of the Board, consisting of persons skilled in Dental Surgery. A candidate whose qualification shall be found insufficient will be referred back to his studies, and will not be admitted to re-examination within the period of six months, unless the Board shall otherwise determine.”—(*Notes and Queries.*)

DENTAL REGISTER OF THE WEST—OCTOBER.

“DENTAL PUPILAGE. By A. LAWRENCE, LOWELL, MASS.

“And how achieved you these endowments, which
You make more rich to owe?”

“Every dentist, who has the permanent respectability of his profession at heart, must be interested in the subject of dental pupilage.

“To usefully and profitably pursue any calling, which anybody ought to engage in, requires previous education—schooling—learning.

“If I am not mistaken, a statute law, or at any rate a custom, of England requires a seven years’ apprenticeship to any trade, no matter what, and I am not aware that much cause for complaint has grown out of the practical working of such law or custom. On the contrary, I hazard the opinion that all parties are benefited *there*, and that the adoption of a similar law or custom in this country would not only tend to give us more really skillful artisans, but do much to moderate that tendency to itinerancy in professions and habitation, which to some extent characterizes our people. It is the facility with which any business may be abandoned and another taken up, that leads to so much ignorance and inefficiency in our profession as well as in others. * * * * *

“I desire to institute no comparisons nor cast reflections upon any member of the profession, who has any business in it, but only to inquire whether we are fully satisfied with the idea that dentistry may be mastered in the short time and with the limited qualifications those wishing to enter our ranks think necessary for the purpose.

“The fact is, that those designing to become dentists wish to do so with as little outlay of time or money as possible, and although they declare for the most thorough course, are almost uniformly surprised to learn what is required of them as preliminary qualifications, term of pupilage, etc., unless, indeed, they have applied to a charlatan. Then the case is different—no familiarity with books—no Anatomy, Chemistry, Physiology, etc.,—no wasting time and money in those humbug Dental Colleges, but most frequently consisting in the sale and purchase of certain mysteries and ‘showing,’ it being fully understood by the high contracting parties that the sooner the stipulations are fulfilled the better for all concerned.

“Now, seriously, we have had enough of such pupilage, and Tom, Dick, and Harry turning dentists in a night, or next thing to it.

“Enough of this half-way teaching as well as of learning, and those of us now upon the stage, in view of the present improved state of dental science, of which we are justly proud, owe it to the public—the great future—to our pupils as well as ourselves, to inaugurate some much needed reforms in the matter under consideration.

"I may properly introduce here as illustrative in part of my own views an article from the By-Laws of the Merrimack Valley Dental Association, organized October 29, 1863:—

"ARTICLE VI. No member of this association shall take a student for a less term than two years, unless he shall have studied dentistry with some other practitioner, so as to make his term of pupilage equal to two years, or has attended one full course of lectures at some Medical or Dental College."

"The American Dental Association at a meeting recently held at Niagara Falls, and the American Dental Convention in session at Detroit a few days after, both passed some resolutions to the same effect, only, I am happy to add, a little stronger.

"Now then if we cannot make a statute law applicable to the case, let us at least establish a custom, that all henceforward may be governed thereby, and thus do something toward further elevating our common fraternity."

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DENTAL SOCIETIES IN THE UNITED STATES.

The following list of Dental Societies in the Union has been carefully compiled and arranged alphabetically by Prof. Taft:—

AMERICAN DENTAL ASSOCIATION—Meets annually (next year at Chicago.) *Pres.* J. H. McQUILLEN, of Phila., *Rec. Sec.* J. TAFT, of Cincinnati, *Cor. Sec.* GEO. W. ELLIS, of Philadelphia.

AMERICAN DENTAL CONVENTION—Meets annually first Tuesday of August, (next meeting at White Sulphur Springs, Ohio.) *Pres.* W. W. ALLPORT, *Rec. Sec.* GEO. W. ELLIS, *Cor. Sec.* W. H. ALLEN, of New York.

List of Societies represented in the American Dental Association.

ALBANY DENTAL ASSOCIATION—Meets monthly at Albany. *Pres.* ROBERT NELSON, *Rec. Sec.* W. F. WINNE, *Cor. Sec.* B. WOOD, of Albany.

BUFFALO DENTAL SOCIETY—Meets monthly at Buffalo. *Pres.* GEO. E. HAYES, *Rec. Sec.* GEO. B. SNOW, of Buffalo.

BROOKLYN DENTAL ASSOCIATION—Meets semi-monthly. *Pres.* W. C. PARKS, *Rec. Sec.* WM. B. HURD, *Cor. Sec.* W. H. ATKINSON, of New York.

CINCINNATI DENTAL SOCIETY—Meets semi-monthly at Cincinnati. *Pres.* A. BERRY, *Rec. Sec.* WM. TAFT.

CENTRAL NEW YORK DENTAL ASSOCIATION—Meets semi-monthly. *Pres.* S. B. PALMER, *Rec. Sec.* S. G. MARTIN, *Cor. Sec.* P. HARRIS, of Skaneateles.

CHICAGO DENTAL SOCIETY—Meets monthly at Chicago. *Pres.* E. W. HADLEY, *Rec. and Cor. Sec.* E. W. SAWYER, of Chicago.

CONNECTICUT VALLEY DENTAL SOCIETY—Meets semi-annually* second Tuesday of May and October. *Pres.* F. SEARLE, *Rec. Sec.* L. D. SHEPHERD, of Amherst, Mass.

* Place of meeting fixed by appointment.

HUDSON VALLEY DENTAL SOCIETY—Meets monthly at Troy, N. Y. *Pres.* H. H. YOUNG, *Rec. Sec.* S. J. ANDRES, *Cor. Sec.* S. P. WELCH, of Troy.

INDIANA STATE DENTAL SOCIETY—Meets annually at Indianapolis on the last Tuesday of June. *Pres.* A. M. MOORE, *Rec. and Cor. Sec.* JOS. RICHARDSON, of Terre Haute, Ind.

IOWA STATE DENTAL SOCIETY—Meets semi-annually* January and July. *Pres.* N. H. TULLOSS, *Rec. Sec.* ———.

MICHIGAN DENTAL SOCIETY—Meets annually fourth Tuesday of January at Ypsilanti. *Pres.* G. W. STONE, *Rec. and Cor. Sec.* G. W. MOSHER, of Jackson.

MISSISSIPPI VALLEY DENTAL SOCIETY—Meets annually, in February, at Cincinnati. *Pres.* A. BERRY, *Rec. Sec.* G. M. FOOTE, *Cor. Sec.* H. A. SMITH, of Cincinnati.

MERRIMAC VALLEY DENTAL SOCIETY—Meets semi-annually* first Tuesday of October and May. *Pres.* A. LAWRENCE, *Rec. Sec.* G. H. GERRY, of Lowell.

NEW YORK SOCIETY OF DENTAL SURGEONS—Meets semi-monthly in New York. *Pres.* WM. B. HURD, *Rec. Sec.* C. D. ALLEN, *Cor. Sec.* C. P. FITCH, of New York.

NEW HAVEN DENTAL SOCIETY—Meets on the first Wednesday of each month at New Haven. *Pres.* J. T. METCALF, *Rec. and Cor. Sec.* C. L. SMITH, of New Haven.

NEW LONDON DENTAL SOCIETY—Meets monthly.* *Pres.* W. W. SHEFFIELD, *Rec. Sec.* ———.

NORTHERN OHIO DENTAL ASSOCIATION—Meets semi-annually, (first Tuesday of May and October,) in Cleveland. *Pres.* B. STRICKLAND, *Rec. Sec.* L. BUFFETT, *Cor. Sec.* B. F. ROBINSON.

OHIO DENTAL COLLEGE ASSOCIATION—Meets annually in February at Cincinnati. *Pres.* C. BONSALE, *Rec. Sec.* J. TAFT, of Cincinnati.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA—Meets on the first Tuesday evening of each month, in Philadelphia. *Pres.* C. A. KINGSBURY, *Rec. Sec.* R. J. HOFFNER, *Cor. Sec.* J. H. MCQUILLEN, of Phila.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS—Meets on the second Tuesday evening of each month, in Philadelphia. *Pres.* W. W. FOCHE, *Rec. Sec.* JAS. TRUMAN, *Cor. Sec.* G. W. ELLIS, of Phila.

PITTSBURG DENTAL ASSOCIATION—Meets monthly (second Tuesday) in Pittsburgh. *Pres.* M. E. GILLESPIE, *Rec. Sec.* J. D. WHITE.

PENINSULAR DENTAL SOCIETY—Meets quarterly.* *Pres.* SAM'L MARSHALL, *Rec. Sec.* W. G. A. BONWILL, *Cor. Sec.* S. S. NONES.

ST. LOUIS DENTAL SOCIETY—Meets monthly at St. Louis.

WESTERN DENTAL SOCIETY—Meets annually.* *Pres.* ———, *Rec. Sec.* A. M. LESLIE, *Cor. Sec.* C. W. SPALDING, St. Louis.

* Place of meeting fixed by appointment.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

“Active and Passive Work.—It was charged as a defect in medical education by no less eminent an authority than the present Archbishop of York, in an address which he delivered at a metropolitan school of medicine in the summer, that it provided for the student too large a share of passive work and too little active work; that it kept the student for too many hours in the position of a listener, and exercised him too little in the capacity of questioner or respondent. He stated justly that there is a limit to the receptivity of the mind; and after listening for a period, even ordinary intelligence requires to be permitted to alter its mode of action—to cease from listening and quietly pondering; and it becomes then an actual relaxation to change the form of mental exercise. Thus the relief afforded by a mixed tutorial system is very great. For a man who has been fixed to a seat receiving a continuous stream of information it is not only a great benefit to be called upon to inspect his mind and see how much he retains of what he has just heard, but it is a great relief to be able to cease from the strain of fixed attention, and to exercise other mental powers—as analysis, expression, or deduction. The substitution of such a mixed tutorial system for continuous lecturing would be very easy in a great number of cases, and very beneficial. After ten minutes’ teaching let the lecturer stop and ask a few questions. He will then keep alive the interest of the students—make them more attentive, and also more retentive. Let him give out at the end of each lecture the subject of his next, and the text-book or authorities which he recommends to be consulted on that subject. His best students will read it up; his lecture will be more profitable to minds already partly prepared, his criticisms more intelligible, and his views more clearly appreciated. He will soon know, too, where to apply for good answers, and where for bad ones, both of which it is well to elicit.”—(*Lancet.*)

“On Teeth. By LIONEL S. BEALE, M.B., F.R.S., F.R.C.P. *Of the Development and formation of the Palatine Teeth of the Common Newt.*—I must not attempt to discuss the various changes occurring in the course of development of the mammalian tooth, for to do so, even cursorily, would occupy many pages, but I may, in few words, discuss the most interesting part of the question—namely, the mode of formation of the papilla. Now, in a minute and difficult inquiry like this, which involves an examination of some of the most delicate tissues at an early period of development when they are exceedingly soft, the observer endeavors to discover one example in which the various anatomical points are very distinct, and then he may, with the aid of the positive facts already ascertained, study higher and more complicated phenomena of the same kind with considerable advantage.

“After examining the teeth of a number of animals at a very early

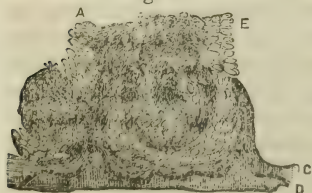
period of development, prepared in the most careful manner for the purpose of investigating the nature of the earliest changes occurring in the formation of the papilla, I found that the process of development could be studied in its simplest condition with comparative facility in the palatine teeth of the common newt, (*triton cristatis*.) As young teeth are being continually found in connection with mucous membrane of the upper jaw of the adult animal, their development could be investigated under great advantage. In the embryo the tissues around the developing teeth are as soft, or softer, than the dental papillæ themselves, which renders the investigation exceedingly difficult; but in studying the process as it occurs in the fully-developed newt, there is no such serious practical disadvantage. Moreover, the number of these teeth is considerable, and being situated in the central part of the upper jaw, they can easily be detached as they grow, with the mucous membrane itself. Sometimes ten or a dozen teeth, in different stages of development, can be isolated in a single specimen. The vessels of the mucous membrane can be minutely injected without difficulty, so that we can ascertain with considerable precision the exact relation of the capillaries to these teeth, and the follicles in which they are developed.

"In investigating the changes taking place in the development of a tissue, great advantage will always be gained by studying the process as it occurs in the fully-formed animal. It is a mistake to suppose that the process of development of tissue can be studied only in the embryo. Every stage of development of fibrous tissue, cartilage, bone, muscle, nerve, ganglion cells, fat cells, and many other tissues, may be seen in the fully-formed frog, and the changes observed far more distinctly than in the embryo. In the adult newt the development of the teeth may be watched from the very earliest stages, and in the same animal may be demonstrated the changes which occur in the development of a complicated gland like the kidney, testicle, and ovary.

"The very youngest palatine teeth can be detached from the surface of the mucous membrane covering the palate of the newt, and it is to be noticed that in attempting to remove the epithelium from the surface of the mucous membrane, a number of entire tooth sacs, many of which contain each an embryonic tooth, are often detached with it.

"Now, each of these little 'sacs' is an oval mass, consisting entirely of cells very closely resembling epithelial cells in their general character. (Fig. 1.) At this early period there is no actual *capsule*, or *external membrane*, but the most external cells are somewhat flattened and spread

Fig. 1.



Two very young tooth sacs, with developing teeth, from the palate of the newt, (*triton cristatis*), magnified 215 and reduced to $\frac{1}{3}$; *a*, a very young tooth sac and tooth; *b*, another, a little older; *c*, marks the position of the basement membrane; *d*, capillary ramifying in the sub-basement tissue; *e*, the epithelial structure in which the tooth sacs are imbedded. This lies upon the surface of the basement membrane *c*.

out, as shown in the figure. This flattening and spreading out evidently arises from the first cells formed being pushed outward toward the circumference by the growth of new cells in the centre of the collection.

These little collections of epithelial-like cells,* which would be termed sacs, are entirely surrounded by and seem imbedded in the epithelium of the mucous membrane, and the cells at the summit of the sac are often seen to be uninterruptedly continuous with those outside. The cells of which these collections are composed differ somewhat from those in which they are imbedded. It need scarcely be said that neither these nor the cells external to them are ciliated. They are of a more oval form than the ordinary epithelial cells covering the palate. The general appearance of each collection of cells is such as would be expected to result if at an earlier period one epithelial cell amongst its fellows had increased in size, divided, and subdivided, and so formed a compact collection of cells in the substance of a cellular layer. At this time the entire mass is composed of small cells only.

"The tooth itself is formed in the very centre of the oval mass composed of cells, after cell multiplication in this part has ceased (Fig. 1, *a* and *b*.) As I have already stated, at this time the oval mass has no fibrous or membranous capsule. The most external cells are a little flattened, but after the tooth has become quite distinct, the entire mass may be broken up by very slight pressure, and nothing but cells result. Moreover, cells are formed to the extent of two or three layers upon the surface of the mucous membrane beneath these oval collections of cells. It is, therefore, quite certain that basement membrane can have nothing to do with the origin of these palatine teeth of the newt, and it is also certain that the young tooth is *surrounded on all sides by cells*. It is developed in the midst of cells. The dental tissue is formed by the impregnation with calcareous salts of a soft matrix, produced, as in other cases, by change occurring in the outer part of masses of germinal matter; and cells which take part in forming new matrix occupy the cavity of the shell of dentine, even when its formation is considerably advanced. No vessels are near the collection of cells in the midst of which the young tooth is growing, nor do they pass into the pulp until some time after the tooth has reached a considerable size, and the formation of the fang has commenced. The first part of the tooth which is formed is the summit, and the fang grows *downward* from the epithelial surface toward the vessels, and the bone into which it is to be received

"The tooth is not developed from a papilla consisting of sub-basement tissue, but it is formed in the very centre of a collection of cells, and it is clear that these cells have been formed in the central part of a pre-existing cellular mass. So that the oldest cells, which seem but to perform the office of a protecting envelope, are outside, and as new ones have been produced in the centre, these oldest cells have been somewhat flattened upon the surface, thus giving the appearance of a boundary or an imperfect capsule, which enables us to distinguish these masses from the collection of cells in which they are imbedded.

"Next comes the important question, how do these collections of cells originate? I feel confident that they commence in a cellular mass, which,

* By the word "cell," as has been already stated, is meant an elementary part, consisting of a mass of germinal matter, which, in the preparation, is colored red with carmine, surrounded by a layer of soft-formed material. Each of the little bodies which compose the oval mass sac, in the centre of which the tooth appears, and each of those around the sac (Fig. 1) is a "cell."

to all appearance, is an epithelial structure. I have seen a single cell differing from its neighbors, in its larger size, dividing to form three or four separate cells, and I believe this was the original cell from which all those which constitute the collection in which the tooth at length appears, resulted.

"The cellular mass is certainly uncovered by basement membrane. (Fig. 1.) It is so easily torn away from the surface of the fibrous tissue upon which it rests that it is often destroyed in preparing it for examination."
—(*Dublin Med. Press.*)

Bony Dentigerous Cyst of the Lower Jaw, excised by S. W. FEARN, Surgeon to the Derbyshire General Infirmary.—"I have lately had under my care, in our county hospital, a case of disease of the lower jaw, of so rare and interesting a character, that I think a short account of it may prove acceptable to the members of our Branch Association; and I feel the more induced to present it to your notice from the fact that, in most of the works on surgery which I have consulted, there is no mention of the disease, and because also I was myself deceived as to its true pathological significance before its removal.

"The following notes are extracted from my hospital case book :—

"Mary Smith, aged 13, was admitted into the Derby Infirmary, February 29, 1864. There was a large resistant tumor of the left side of the lower jaw, extending from the ramus to the symphysis; and there was considerable enlargement also of the right side of the jaw, as far back as the ramus. The tumor had been growing about six months; and there was a constant very fetid discharge from its surface. Several teeth had been extracted; but the second permanent molar and one of the milk molars remained on the side most affected. There was much irregularity in the growth of the teeth on the right side. I was unable to detect any opening into the tumor, on examination with a probe. The breath was exceedingly fetid, though her general health was very good. I ordered her a lotion containing permanganate of potash and glycerin, to be used frequently.

"March 15th. The disease being considered one of the enchondromatous growths commonly called osteo-sarcoma, I to-day removed it in the following manner: After extracting the left central incisor, an incision three or four inches long was made along the base of the jaw to the chin; and the soft parts separated from the bone without dividing the lip, so as to allow the passage of a fine metacarpal saw between the lip and the jaw. The mouth had been previously gagged with a contrivance made for the purpose by Mr. Morley, dentist. The bone was partially sawn through at the symphysis, and the division completed with strong cutting forceps. The incision was then extended along the base to the angle of the jaw, and thence as high up as the condyle. The facial artery bled freely, and was at once secured, as were also several other vessels. The soft parts covering the exterior of the bone were carefully dissected away, and the flap raised so as thoroughly to lay open the cavity of the mouth. On the division of the jaw, a considerable quantity of fetid pus escaped. The separation of the soft parts from the bone within the mouth required much care, as did also the detachment of the soft parts from the ramus and coronoid process. The disarticulation was pretty easily effected, and no vessel of any importance was wounded. Five ligatures were re-

quired; and the flaps were brought together with wire sutures at short intervals.

"The diseased mass was found to be essentially a large osseous cyst of considerable thickness and density, separating the outer and inner plates of the jaw. The cavity was lined with a thickened, pulpy, very vascular membrane; and the canine tooth was seen growing from its floor. The cyst extended from the ramus of the left side beyond the symphysis for an inch and a half into the body of the jaw on the right side. A portion of the bony cavity on the right side I removed with the bone-forceps; and, in doing this, the muscles attaching the tongue to the inside of the jaw were necessarily divided. This was followed by a retraction of the tongue, which had to be secured to one of the wire sutures by a double thread.

"The patient was seated in a chair, in which she was secured with roller-towels during the operation; and, on its completion, she became so collapsed that we were fearful she would have sunk. She was immediately placed on the table, and restorative means employed before the dressing could be proceeded with. The chloroform was very efficiently and carefully administered by my friend Dr. Goode.

"8 P.M. She was pretty comfortable; had no pain in the face or wound; but complained of headache, and of the ligature in the tongue, which I loosened, so as to allow of more play in swallowing. She had tea and wine and water several times. There was very little fever. The headache was probably occasioned by the chloroform. Pulse 120. Should she be restless, she was ordered to have a third of a grain of morphia. 16th. She has had a good night, with frequent sleeps of half an hour's duration. She took tea and beef-tea; was rather thirsty; pulse 120. The morphia was not given. *Vespere*: She was flushed and rather feverish; pulse 116. The thread through the tongue was removed; and she afterwards swallowed a little milk. The bowels were not open. She was ordered to have an injection. 17th. She was much better. The bowels were freely open this morning. There was no heat nor flushing; pulse 108. There was a good deal of ropy secretion from the mouth. *Vespere*: The cheek was swollen and red. She was rather feverish; pulse 106. She was directed to repeat the injection, and to apply cold water cloths to the cheek. She had slept much during the day. 18th. She had a good night. The bowels were open twice. There was no fever; less flush; pulse 100. The wound seemed to be uniting by the first intention. 19th. Nearly all the sutures were removed. Union seemed perfect. In all respects, she was going on well. 21st. The remainder of the sutures were removed, and three of the ligatures. She was very well. 23d. The remaining ligatures came away yesterday. There was some suppuration and salivary discharge from the parotid gland. There was perfect control over the right half of the jaw; and there was now no difficulty in swallowing, and hardly any soreness in the mouth. 25th. The mouth was comfortable; the wound was healing very satisfactorily. She was ordered to use the following lotion to the mouth frequently: *R*.—Sodæ biboratis, ℥iss; tincturæ myrrhæ, ℥iii; glycerin, ℥ss; aquæ ad Oss. M. 28th. She was allowed to get up. 30th. Three or four points in the line of the cicatrix, from which there was a salivary discharge, were touched with caustic. The face on the left side was entirely paralyzed.

"April 9th. There was still a little salivary discharge from two or three points. The whole side of the face was swollen and puffy, and lower

eyelid was rather œdematous. The mouth was quite healed. 23d. She was discharged cured.

Remarks.—I have said, at the commencement of my paper, that but little is to be gathered from surgical writings on the subject of these cysts. A mere allusion is made to them in 'Druitt's Manual,' and in 'Paget's Lectures on Surgical Pathology,' at page 440, after speaking of ovarian and other cysts containing teeth, he says: 'Other dentigerous cysts occur within the jaws. In some cases, cysts are hollowed out in the substance of the upper or lower jaw, and are lined with a distinct membrane, to some part of which a tooth is attached. I believe these are examples of tooth capsules from which the teeth, though perfectly formed, at least in their crowns, are not extruded, and which therefore remain, becoming filled with fluid, and growing larger.' In a foot note, Mr. Paget mentions two examples of the disease which are in the museum of St. Bartholomew's Hospital; and a third, which he saw cured by Mr. Wormald, by cutting away part of the cyst, and removing the tooth. Mr. Paget also alludes to the subject in an article on Innocent Tumors, in 'Holmes' System of Surgery;' as does also Mr. Holmes, in an essay on Diseases of Bones, in the same work.*

"I believe the case before us (a preparation of the diseased growth in which, and photographs of the patient, taken four or five weeks after the operation, I have the pleasure to exhibit) is an instance of the kind described by Mr. Paget; and that the thickened pulpy membrane lining the bony cyst is merely the canine tooth capsule, distended in the first instance with its own proper fluid, and afterward assuming dropsical proportions. The crown of the tooth seems perfectly developed; but there is no appearance of fang, and there is no indication of the existence of the permanent bicuspid. The fluid contents of the cyst had long been putrid and puriform; and I think, looking to the solid character of its bony wall, and the great size it has attained, it is very improbable that a mere perforation and evacuation of it would have led to a cure of the disease. It is more likely that an exhausting drain would have gone on for some indefinite period, seriously damaging the patient's health, and resulting in necrosis. The cyst was found, on measurement, capable of holding an ounce and a half of fluid.

"I was struck, in the after-treatment of the case, by the little trouble occasioned by the remaining half of the jaw. There was scarcely any tendency to depart from its proper position; and this I attributed to the division of the genio-hoid, the genio-hyoglossi, and the digastric muscles, at their attachment to the tubercle inside the symphysis. There seemed to be a perfect balance in their antagonism between the pterygoid muscles and the masseter; though later on, when the tongue muscles and the digastrici had, at their points of division, contracted adhesions to the neighboring structures, they again asserted their power, and produced some drawing in of the jaw. There is, however, much less deformity than might have been expected after such an operation; and I feel no doubt that, after a further lapse of time, the poor girl will have a very presentable appearance. The power to protrude the tongue was only partially recovered at the time of the patient's discharge from the hospital. She could then only make its tip touch the lower lip.

* M. Forget's monograph on "Dental Anomalies" affords much interesting information on this subject.—Z.

"It has struck me that much of the trouble experienced, in cases of fracture of the lower jaw, in keeping the broken portions in apposition, is occasioned by the contraction of the tongue muscles and the digastrici. As long as the jaw remains entire, it is a fixed point for these muscles to act upon; but when the bone is broken through, the resistance being lost, it is drawn inward by the action of the muscles, which have now lost their natural antagonism. In the absence of a proper mechanical contrivance, might not much of the difficulty, in some of the embarrassing cases we meet with, be got over by a subcutaneous division under the chin, or within the mouth of the attachment of the muscles inside the symphysis?"

"I may mention, in reference to osseous cysts of the jaws which are not of the dentigerous kind, that the best account I have found of them is contained in Dupuytren's work on the 'Diseases and Injuries of Bones,' translated by Mr. Le Gros Clark, and published by the old Sydenham Society. Nine cases are there related of bony cysts of the upper and lower jaws, some containing fluid, and others fibrous growths; but none of them appear to have been of the character exhibited in the specimen before you, though Dupuytren remarks, that 'teeth are sometimes found in cysts inclosed in bone,' and mentions a case in which M. Loir showed him an osseous cyst developed in the palatine process of the superior maxillary bone, the immediate cause of which, he says, was clearly the reversed position of a tooth. This case was, I suspect, an instance of distended tooth capsule, though it does not appear to have been so looked upon by Dupuytren. I think it probable, too, that one or two of his other cases had the same pathological meaning, though he seems himself not to have been aware of their true character."—(*Brit. Med. Jour. and Dub. Med. Press.*)

"*Osteogenesis.*—DR. BRUCH, of Germany, has communicated to the Academy of Sciences the results of his researches on osteogenesis. The main conclusion our author derives from his study of this subject is as follows: 'I consider it incontestible that the osseous tissue in all classes of vertebræ is formed by *epigenesis*, that is, by successive layers which are of an osseous nature from their beginning, either at the external or internal part of the cartilages. The pretended ossification of the cartilage never produces bone, it is always cartilage impregnated with calcareous substances, the cellules of which always maintain the same form, and are never transformed into anastomotic radiary osseous corpuscles.'"—(DR. W. N. COTE, *Med. and Surg. Rept.*)

"*On the Size of the Blood-corpuscles in Relation to the Size of the Animal, its Organization, and Powers of Endurance.* By E. CRISP, M.D.—The object of this paper, read at the late meeting of the British Association, was to show that the opinion generally entertained, that the largest animals in the same family had the largest blood-globules, was erroneous in many instances. Examples were given among the quadrumana (apes and monkeys) of exceptions to this supposed law: thus, the little Marmoset and Silky Tamarm had corpuscles as large as those of the larger monkeys. Among the Cheiroptera (bats) similar examples were given. In the *carnaria*, the common cat had a corpuscle as large as that of the lion or tiger. In the rodents, the little harvest mouse had as large a blood-disc as the common rat or gigantic rat. In the other orders the

great kangaroo, tree kangaroo, giraffe, tapirs, hogs, ass, horse, and many others were advanced as disproving the correctness of this assumed law; and it was a curious fact that all the mammals with large blood-corpuscles might be called aberrant, such as the elephant, cassybara, and great ant-eater. Among birds, the ducks, swans, geese, and many others afforded exceptions, and the reptiles were still more prolific in examples; thus, the little slow-worm, as Dr. Crisp had shown in 1854, had corpuscles as large as those of the huge Python, weighing 100 lbs. In fishes, the blood-discs of the little gudgeon were as large as those of the big bream. The mackerel's blood-corpuscle was as large as that of the huge tanny, and that of the small trout equaled in size the blood-corpuscles of the salmon. In answering the question whether the size of the corpuscles was smaller in animals of higher organization and greater powers of endurance, the orang, chimpanzee, and many of the smaller monkeys, race-horse, cart-horse, greyhound, pug-dog, hare, rabbit, goat, otter, fox, sheep, hog, rapacious birds, slow-worm, python, sharks, and others were adduced to show that this opinion was incorrect. As regards the size of the blood-corpuscles, it was not to be wondered at that a large animal had a large blood-corpuscle, but it was surprising that one little harvest mouse should have a blood-disc as large as that of the giraffe, and that the blood disc of the tiny marmoset monkey, weighing 9 ozs., should equal in diameter that of the large baboon, exceeding the weight of 60 lbs. ! The blood-corpuscles of 180 animals (drawn to scale) were exhibited."—(*Med. Times and Gaz.*)

"The Physiological Effects of Tobacco. By B. W. RICHARDSON, M.A., M.D.—Dr. Richardson's views on the physiological effects of tobacco were given in the following summary: 1. The effects that result from smoking are due to different agents imbibed by the smoker, viz., carbonic acid, ammonia, nicotine, a volatile empyreumatic substance, and a bitter extract. The more common effects are traceable to the carbonic acid and ammonia; the rarer and more severe to the nicotine, the empyreumatic substance, and the extract. 2. The effects produced are very transitory, the poisons finding a ready exit from the body. 3. All the evils of smoking are functional in character, and no confirmed smoker can ever be said, so long as he indulges in the habit, to be well; it does not follow, however, that he is becoming the subject of organic and fatal disease because he smokes. 4. Smoking produces disturbances: (a) in the blood, causing undue fluidity and change in the red corpuscles; (b) on the stomach, giving rise to debility, nausea, and in extreme cases sickness; (c) on the heart, producing debility of that organ and irregular action; (d) on the organs of sense, causing in the extreme degree dilatation of the pupils of the eye, confusion of vision, bright lines, luminous or cobweb specks, and long retention of images on the retina, with other and analogous symptoms affecting the ear, viz., inability clearly to define sounds, and the annoyance of a sharp ringing sound like a whistle or a bell; (e) on the brain, suspending the waste of that organ, and oppressing it if it be duly nourished, but soothing it if it be exhausted; (f) on the nervous filaments and sympathetic or organic nerves, leading to deficient power in them, and to over-secretion in those surfaces—glands—over which the nerves exert a controlling force; (g) on the mucous membrane of the mouth, causing enlargement and soreness of the tonsils—smoker's sore throat—redness,

dryness, and occasional peeling off of the membrane, and either unnatural firmness or contraction and sponginess of the gums; (*h*) on the bronchial surface of the lungs when that is already irritable, sustaining the irritation, and increasing the cough. 5. The statements to the effect that tobacco smoke causes specific diseases, such as insanity, epilepsy, St. Vitus' dance, apoplexy, organic diseases of the heart, cancer and consumption, and chronic bronchitis, have been made without any sufficient evidence or reference to facts; all such statements are devoid of truth, and can never accomplish the object which those who offer them have in view. 6. As the human body is maintained alive and in full vigor by its capacity, within certain well-defined limits, to absorb and apply oxygen; as the process of oxidation is most active and most required in those periods of life when the structures of the body are attaining their full development; and as tobacco smoke possesses the power of arresting such oxidation, the habit of smoking is most deleterious to the young, causing in them impairment of growth, premature manhood, and physical degradation."—(*Ibid.*)

"Suture of the Median Nerve.—M. LANGIER, in a second paper, furnished the Academie des Sciences with some additional information respecting the case (*Medical Times and Gazette*, July 9,) in which he had performed suture of the median nerve. On the twelfth day after its application, the thread uniting the two ends of the nerve came away, having cut through the portions comprised by it. Up to this time the recovered sensibility and motions of the fingers had persisted unimpaired; but at the time of the fall of the suture inflammation seized the nerve at the point exposed in the wound, and was accompanied by lancinating pains along the fingers, which, however, were very unequally distributed, the ring finger, for example, being exempt from them. At the same time, the painful fingers lost again a notable portion of the tactile sensibility of their palmar surfaces, but this in very unequal degree and extent in the different fingers. At the end of five or six days the pains due to the neuritis became assuaged, being only perceived at certain points at intervals; and after the subsidence of the pains the tactile sensibility began to reappear, so that by the twentieth day after the fall of the suture it had regained considerable precision. During all this time, the movements of the thumb remained intact, and had even increased in the power they possessed the first few days after the operation—not only the movement of opposition, but that of circumduction, having been practicable for more than three weeks."—(*Ibid.*)

"Pathology and Treatment of Aphthæ.—In the *Gazette Hebdomadaire*, DR. JULES WORMS treats, in a recent paper, of a disease which is lost in the host of buccal affections described by modern authors. His subject is *aphthæ*—a denomination formerly applied to every superficial and acute irritation of the mucous lining of the mouth, and which Guersant, Billaut, and Gardien have shown to consist in a vesicular and ulcerous eruption of the mucous membrane, which runs its course in the period of one or two weeks.

"From minute examination of the deposit on the surface of aphthæ, Dr. Worms concludes that it consists of a fatty matter, which is not to be

found in any other disease of the mouth, and exclusively characterizes aphthæ. The epithelium rises and soon breaks, exposing to view a yellowish secretion, previously discernible through the transparent cuticle, and of which the microscope and chemical tests invariably show the sebaceous nature. It may, on the other hand, be remarked that aphthæ are never met with on the anterior portions of the mucous membrane, where anatomists have failed in discovering any muciparous glands, and where *herpes labialis* more commonly occurs; hence Billard's surmise that aphthæ are a disease of the mucous follicles, characterized by a peculiar sebaceous deposit, acquires additional probability.

"In Dr. Worms' opinion, aphthæ are, therefore, but the *acne* of mucous membranes.

"This practitioner infers from the solubility of the exudation in ether, that this substance may be a useful local remedy for aphthæ. The pain caused by the eruption, and the difficulty of checking its progress, are well-known features of the disease, and the inefficacy of cauterization, chlorate of potash, anodynes, and other methods of treatment usually prescribed, is very generally acknowledged. Dr. Worms has, on the contrary, resorted to ether with much benefit; this remedial agent removes the yellowish secretion, a new epithelium promptly forms, and no trace of the superficial ulcers remains beyond slightly increased vascularity of the mucous membrane. Either may, therefore, be applied locally with advantage, but the fact of the frequent connection of aphthæ with gastric disturbance must at the same time be borne in mind."—(*Glasgow Med. Journ.*, from *Journ. Pract. Med. and Surg.*, and *Am. Journ. Med. Sci.*)

Constitutional Syphilis — A Clinical Lecture by JONATHAN HUTCHINSON, F.R.C.S., Surgeon to the London Hospital.—"I sometimes feel almost annoyed at being compelled so very frequently to prescribe iodide of potassium. We go from bed to bed, and to cases apparently of the most different kind, and for almost one in every three I am obliged to dictate the same prescription.* Iodide of potassium in large doses, generally in combination with ammonia, and sometimes with the bichloride of mercury, seems to be the panacea for almost a majority of our cases of chronic disease. Here is a man with convergent squint and double vision; he has come up from Cornwall to be treated, and he looks perfectly healthy. We investigate his case, and pronounce the diagnosis of syphilitic paralysis of his right sixth nerve. A man, a few beds lower down, came in on account of a pain in his heel, which had resisted all treatment for months, and prevented him from either working in the day or sleeping at night. He, too, looked quite healthy; but, on probing his symptoms and history, I gave a syphilitic diagnosis, and, what is more, confirmed it by quickly curing him. A woman was admitted six weeks ago with numerous large ulcers on the legs, and some also on her arms. She had scars of former ulcers about her knees; and the multiplicity of the sores and the worm-eaten character of their edges confirmed the suspicion formed at first glance. She, like the former patient, had had much previous treatment without result, and got well most rapidly under our

* In mentioning this proportion, I of course allude only to our wards for chronic disease, and do not include those for accidents.

favorite prescription. There is a boy in Talbot Ward with ascites, and with a liver which reaches below his navel, and with hard periosteal nodes on almost every long bone in his body. His sister was also here not long ago, suffering from nodes; and his mother I have repeatedly had under care during the last fifteen years, for various forms of constitutional syphilis. We have also in the same ward two men suffering from chronic enlargement of the testis, which we attribute to the same almost ubiquitous taint. One of them is already nearly well; and the other, I have no doubt, will soon be so.

"If we go down stairs to the women's ward, we shall find some most interesting cases. There is Mrs. G., the unfortunate wife of a very dissolute sea-captain. She came into the hospital in order to have her sight improved by an artificial pupil, in consequence of adhesions, etc. One of her eyes is shrunk, soft, and collapsed; and she has, or rather had, the pupil of the other eye almost wholly closed by lymph. I have made her an artificial pupil, and she sees as much better as we could expect. You will notice that she speaks thickly; uses her limbs awkwardly; and, although not yet even middle-aged, looks as if she were entering on second childhood. Her history is that of a case of subacute syphilitic inflammation of the pia mater. She first came under my observation more than a year ago, at the Moorfields Hospital, for most acute double iritis, and covered with syphilitic rash. The pupils were already closed with lymph, and she was already salivated. We adopted the treatment which seemed best; but, as you see, only with very partial results as regards her eyesight. In her right eye, choroiditis and inflammation of the vitreous body afterward set in; and the eye ultimately became soft, and then shrunken, as it now is. After this, she became exceedingly nervous, could not sleep at nights, and was at length laid up at home with delirium. She was now for some weeks under private care with a form of mania; all her limbs became weak and tremulous; and, when she recovered, those of her left side were weaker than the others. As syphilitic inflammation often attacks the choroid coat of the eye, there is no reason why it should not affect the vascular membrane of the brain; and to suppose that it did so in this instance would well account for all her symptoms.

"In the same ward is a girl aged fifteen, whom we admitted a week ago with large, ragged-edged, very deep ulcers on the back of one leg. They are ulcers of a character which, if seen in an adult, you would at once pronounce to be those of tertiary syphilis. And, in confirmation of that view, she has an induration in front of one tibia. The girl is, however, only fifteen; and she has had these ulcers for several years. The disease in her is congenital; and she shows, in order to help us to this opinion, one of the most typical sets of teeth that I have ever seen. You will note that her physiognomy would not have led us to suspect her, for there is nothing very peculiar in it. The bridge of her nose is not flattened; her forehead is not protuberant; nor are there any scars of fissures about her mouth. Her teeth, however, tell the tale, and are so characteristically malformed that I should venture a positive opinion without other evidence. You will watch the effect of specific treatment upon her ulcers. I will ask you to observe that the ulcers are clearly not due to mere ordinary cachexia, for the girl looks healthy; and should they be well under iodide of potassium in a few weeks, I shall then ask you to remember that they had existed for several years before she came here.

"I have only mentioned about a third of the curious forms of constitutional syphilis at present under our care. You will observe that I omit all primary and secondary forms of disease. Those which we shall at present consider are such only as occur at long periods after the original disease, and come into the category of late tertiary affections. Our knowledge of this latter class has of late years very much improved, and we are now able to recognize many as such which formerly we did not know; and, I am glad to add, we are able to exclude some from suspicion which were formerly much suspected.

"The feeling of annoyance to which I adverted, as sometimes arising when one is obliged over and over again to prescribe the same specific, has its origin in a doubt and a fear—a doubt of one's own accuracy of judgment; and, secondly, a fear of the criticisms of others. A sort of fear arises as to whether, after all, the suggestions now and then made, 'Oh, he is riding his hobby—he sees syphilis in everything,' may not have some foundation in truth. Now, this self-mistrust is very natural and very useful in its proper place, but let me warn you not to let it go too far; and, as regards the criticisms of others, let me beg you not to allow them to influence your judgment one iota. There is not the shadow of a doubt that the syphilitic virus is capable of producing effects at extremely remote periods, and after long intervals of apparently good health. There is not the least doubt, further, that this virus is very widely diffused amongst all classes of the community. We must, therefore, expect to encounter its results very frequently, and under very varied circumstances. Our duty in this matter is to find out with accuracy, amongst the great variety of chronic maladies which come before us, which are syphilitic and which are not. Upon our success in diagnosis will depend our success in treatment. There is no room for joking skepticism. It is a simple question of fact. My patient presents a form of disease which we know must have had some cause. We know, further, that the syphilitic taint is a cause quite capable, in some instances, of producing a similar result; and we want to find out by collateral evidence whether that cause is in operation here. And, if it should so turn out that we are obliged, after painstaking investigation, to believe in the presence and efficiency of that special cause in five out of every twenty patients, it cannot be helped. We want truth; and, if that is the truth, we must take it and act on it. A good means of checking our own conclusions is always at hand. I allude to the results of treatment. In most cases of tertiary syphilis, the consequence of acquired disease, the effects of specific treatment are most prompt and definite. Unfortunately, it is not so in a few, especially in those which concern the nervous system; and it is not so in many which are consequent on inherited taint. In these, the efficacy of specific treatment is often but ill marked.

"Before proceeding to relate cases in detail, there are three or four doctrines regarding syphilis which have of late years fought their way to general belief, to which I must ask your special attention.

"The first of these is, that tertiary syphilis may, and often does, last through a person's life. By tertiary syphilis we mean all forms of specific disease occurring subsequently to the primary and exanthematic stages; practically, everything that comes later than two years after the infecting sore. The exanthematic stage usually occurs within two months of the original sore, and is rarely protracted beyond the year. We will,

however, to give good margin, say two years. After this the disease appears to have no stages; periods of entire latency, of the most variable lengths, may occur. The symptoms which show themselves are irregular, and subject to repeated relapses after cure by treatment. Between the secondary and tertiary symptoms, an interval of health, often of several years, and it may be of many, supervenes.

"The second cardinal doctrine, as regards tertiary disease, is what I have just adverted to: that it may be *latent*. By latent, I mean that it may be entirely concealed. The patient may appear to be in robust health; may not show the slightest trace of a symptom; may even marry and beget healthy children; and yet the disease may reappear. In a recent lecture I brought forward a case in which the period of latency had been twenty years; and I shall have to mention several others in which it has been nearly as long. The phenomena of latency are even more wonderful in respect to inherited than they are in regard to acquired disease.

"Thirdly, I wish to insist that it is very common for married women to acquire a constitutional taint, without having ever had primary or secondary disease, and, therefore, without either themselves or their husbands having the slightest suspicion as to what has happened.* This occurs in women who have borne children to syphilitic husbands, and who have imbibed from the fluids of the fœtus the poisonous material. We will call this 'Syphilis by conception.'

"Lastly, we must remark that it is very possible for a patient to have primary syphilis, and never be aware of it. In a woman this may easily be. A small indurated chancre causes very little irritation, and is perhaps never suspected to be of any consequence. It so happens, that the sore most likely to infect gives the least local annoyance; and many an inexperienced man will allow a sore of this kind to go on without treatment, and afterward, in good faith, assure his surgeon that he has 'never had a chancre.' But there are cases even yet more difficult to explain, in which even a practiced eye never finds the infecting sore. I have more than once or twice known it to happen, that surgeons or medical students, who came under treatment for secondary forms of disease, and who made not the slightest attempt at secrecy, assured me that they had never been aware that they had primary sores.

"The chief lesson to be drawn from these various sources of fallacy in the histories we receive is, that the surgeon must learn, by widely-extended practice, to trust to his own eyes for a diagnosis. The importance of being independent of what our patients may tell us can scarcely be exaggerated in this matter. Not only will it save us from being misled by erroneous statements, but it will in some cases save the necessity for asking annoying and painful questions.

"We will now proceed with some clinical illustrations of our remarks.

"Latent Syphilis; an Interval of Eight Years without Symptoms, the Patient enjoying Robust Health; Ulcerative Destruction of the Palate, with Psoriasis of the Backs of the Hands.—Wendon Dawson, aged thirty, a dark-complexioned man, looking much older. Nine years

* According to my own observation, the reverse of this may also occur, and the husband be constitutionally infected without any local lesion or primary disorder.—Z.

ago he had a sore. He was then in the navy, went into Chatham Hospital; 'took mercury pills, and was salivated freely.' He had a bubo in one groin, which suppurated and remained open for two months. He left the hospital after six weeks, and took no more medicine. He recollects that he had a sore throat; but does not remember any rash.

"On leaving the hospital he went on board ship again; and had good health and remained quite well. Three years later he married. His wife has never conceived, and has remained in perfect health. Very soon after he married he had 'yellow jaundice,' and was very ill for a week or more; he was at home a month. About a year ago his throat began to be sore; and six months after this sore patches showed themselves on the backs of his hands. He has only been under treatment for these affections for about two months. During the interval since his discharge from the Chatham Hospital, with the exception of the attack of jaundice, he has enjoyed good health; and has been wholly free from symptoms; 'never lost a single day's work.' We questioned him most closely, and could not make out that he had had any suspicious symptoms whatever.

"January 13th, 1864. The subject of the above notes was sent to me by Mr. Swales, of Sheerness. He is now cachectic, and speaks in a hoarse whisper. His soft palate is extensively destroyed by ulceration, which is still spreading; his breath has the fetor of diseased bone. The backs of his hands and wrists are covered by patches of psoriasis, with fissures and peeling of epidermis, just like the common psoriasis palmaris. There is not a single patch in either palm. There are two or three similar patches on each cheek. The man states that he has never had any venereal disease since the one described nine years ago, and there is not the least reason to doubt his statement. Let us note also that, although salivated in the first instance, he has never needed any medicine since, except during the last few months. Under about two months' treatment, this patient got quite well as regards his throat; and his psoriasis, although not cured, was much benefited.

"In the next case, we have again phagedæna of the throat; but its chief interest attaches to the fact that the man has entirely lost his hearing. With regard to the throat, I may, however, here ask your attention to the difference between the secondary and tertiary forms of disease as they occur in it. In the secondary stage, the inflammation is always superficial, and always ends in cicatrization, without noticeable loss. Indeed, excepting in the tonsil itself, there is rarely any ulceration. On the velum palati and pharynx it is rather inflammatory swelling than ulceration. All the deeply ulcerative or phagedænic affections of the throat occur years after the primary disease, and are tertiary. Of this, both the cases before us are examples."—(*British Med. Jour.* and *Dublin Med. Press.*)

Solubility of Gold in Nitric and Sulphuric Acids.—MR. ARTHUR REYNOLDS gives in the *Chemical News* the following detail of his observations on the solubility of gold: "The alloy of silver and gold was exposed to the action of nitric acid until the gold was left in a powder. On heating this powder with sulphuric acid a yellow solution was obtained, which, when poured into water, gave a purple precipitate. This at first led me to suppose that the sulphuric acid had dissolved some gold; so after washing, the gold was heated for some time with strong

sulphuric acid, without any solution taking place; but on adding a little nitric acid an immediate yellow color was observed in the liquid, and, on pouring it into water, the same blue precipitate was obtained. The experiment has been repeated, and the acids were of course tested to ascertain their purity; but the solution contains the gold evidently in a different state of combination from that produced by dissolving in nitric and hydrochloric acids, for it is again precipitated by water.

"A tenth of a grain was easily dissolved in this manner; but had the heat been continued, no doubt a larger quantity would have been obtained in solution"

"On the Solubility of Gold in Acids. By JOHN SPILLER, F.C.S.—The interesting discovery which my friend Mr. Arthur Reynolds, B.Sc., communicated to you in his letters of July 23 and October 1, has been made the subject of experiment on the part of myself and colleagues, and not only do we find Mr. Reynolds' conclusions in every way confirmed by our own experience, but the conditions involved in these remarkable reactions have, we trust, received some further elaboration by the experimental results which I now proceed to describe:—

"Native gold, and more quickly the precipitated form of the same metal, are soluble on digestion with hot concentrated sulphuric acid mixed with a little nitric, with production of a yellow solution, which, on being diluted with water, lets fall a precipitate of gold, the color of which is either bluish purple or bronze brown, accordingly as it is viewed by transmitted or reflected light. The tint is, however, subject to variation by the presence of extraneous salts, which have the effect of modifying the cohesion of the particles in a manner similar to that pointed out in the case of another kind of reduced gold by Professor Faraday.

"If a small quantity of the yellow gold solution be poured into a porcelain capsule and left exposed to the air, a purple halo and lustrous metallic film of reduced gold will quickly be formed by the operation of the atmospheric moisture. On applying heat this effect will be counteracted, but it is difficult in a shallow open vessel to form again the yellow solution. The experiment succeeds, however, perfectly when a test tube is employed.

"The character of the gold compound existing in the yellow solution is manifestly different from the tetrachloride and other ordinary combinations of this metal. It becomes transformed at once into the chloride of gold by the addition of hydrochloric acid, sal ammoniac, or any soluble chloride such as that of sodium, calcium, or barium, and the solution may then be diluted with water without any of the gold being precipitated. As would have been anticipated, the addition of a small quantity of common salt will slowly redissolve the purple deposit formed on diluting the new gold solution.

"I have succeeded in rapidly producing this interesting combination of gold by arranging a plate of this metal as the positive terminal of a few cells of Grove's battery, while immersed in a mixture of about nine parts of sulphuric acid to one of concentrated nitric acid, and employing a piece of platinum foil or wire-gauze as the opposite pole or terminal in connection with the zinc of the battery. Oxygen gas was freely evolved, but almost immediately the yellow color due to the presence of gold in solution became apparent, and the passage of the electric current was continued until bright gold commenced to be deposited upon the platinum

terminal, from which throughout my experiment no hydrogen gas was disengaged.

"If concentrated sulphuric acid be used alone in the electrolytic cell the gold plate will likewise be attacked, but the metal is at once reduced by the nascent hydrogen which freely escapes from the platinum; so that it does not appear to be possible to prepare the new gold compound in this manner. By the use of diluted sulphuric acid there was no solvent action exerted upon the gold, but the surface of the metal soon became tarnished or iridescent by the formation of a thin and strongly adherent film of brown oxide. This result appears to have been already observed by Professor Bunsen when employing for the electro-decomposition of water (mixed as usual with sulphuric acid) an apparatus in which the platinum terminals chanced to be attached to their connections by means of gold solder.

"Further researches are required for the purpose of indicating the exact constitution of the gold compound which forms the subject of the present communication. It does not appear to be identical with the solution of gold described under the name of 'sulphate of auric oxide' by Pelletier, (*vide* Gmelin's 'Handbook of Chemistry,' vol. vi. p. 211,) inasmuch as it cannot be asserted with respect to the soluble combination discovered by Mr. Reynolds, that 'when gently heated it deposits metallic gold.'"—(*Ibid.*)

Quicksilver Test.—"Quicksilver, after being extracted by the plain process of retorting, is seldom quite pure, and generally contains a small proportion of other metals. The eminent naturalist Priestly suggests a very simple method to purify mercury, by merely shaking it strongly in an iron flask, and renewing the air in the same repeatedly with a pair of bellows. By this manipulation a black powder will be formed on the surface, which can easily be separated. If no more of this dust is formed the quicksilver may be considered pure. In this state it will always give a clear sound when agitated in the flask, while an admixture of lead will make it sound dull, as if the vessel were made of potter's clay. It is often found in the market willfully adulterated with lead, tin, and bismuth. Of lead, it can absorb or dissolve almost one-half of its weight, without losing much of its liquidity. This adulteration can easily be discovered by rubbing some of the metal on the open palm; if it soils the skin it is adulterated—if pure it leaves no trace. Besides, if dosed with lead, it will leave a tail behind—*il fait la queue*, to use a French expression—that is, the drops, instead of being globular, will assume an elongated form, and a more or less flattened surface. Some of these observations may be, perhaps, useful to the gold miner, as many complaints have latterly been heard about the impurity of the quicksilver sold in the mines, which fact is also proved by the frequent occurrence and admixture of base metal in the amalgam gold, probably in most cases by artificial means."—(*San Francisco Mining and Scientific Press and Scientific American.*)

"Gold Test.—A good test for gold or silver is a piece of lunar caustic, fixed with a pointed piece of wood. Slightly wet the metal to be tested, and rub it gently with the caustic. If gold or silver, the mark will be faint; but if an inferior metal, it will be quite black. Jewelers who purchase old gold often use this test."—(*Scientific American.*)

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, DECEMBER, 1864.

No. 5.

ORIGINAL COMMUNICATIONS.

—
PRACTICAL HINTS.

BY J. D. WHITE.

Removing Plugs for Treatment of Periostitis and Alveolar Abscess.—We have spoken of the treatment of inflamed pulps by removing plugs. It is fully as important to remove a plug for periostitis as for an inflamed pulp, because the tooth becomes so morbid in its condition that the removal of a plug is necessary to *ventilate* a tooth for its proper treatment; and in many instances this is all that is necessary. What is the pathology of a tooth when it has lost its pulp, and is plugged, root and all, with gold or any other metal? It is simply the centre of the determining fluids which were destined to supply it with vitality and nutrition, with its vascular circulation so broken up that it cannot return those fluids to the circulation from whence they came, and hence it becomes a *stagnant pool*, and taxing other vessels that have enough to do themselves to take back by anastomosis what the tooth should manage and its immediate blood-vessels control. A tooth absorbs a large amount of fluid from the periosteum, if not by direct vascular supply; and this fluid becomes morbid as soon as it enters the dead portion of the dentine after a pulp has been destroyed. And how can that morbid fluid return upon those membranes from which it was derived without producing in those membranes and surrounding tissues irritation? It always does; even by the external appearance of the gum a dead pulp can always be detected. When the irritation and tension of the parts become so great as to be painful, the removal of the plug from the tooth entirely lets out the gases and morbid fluids; and thus relieving the strain upon the external tissues the tooth may, in a short time, become comfortable without any further treatment whatever. In due time the tooth can be again plugged. As age advances in a patient, as a rule, this condition of

things becomes less troublesome; still cases do happen, from nearly a *total* death of a tooth, that it is necessary to extract it. Plugs ought to be removed more often than they are after a pulp is destroyed, if for no other purpose than to relieve the parts from irritation. We have a number of patients who understand this subject, and frequently consult us about the propriety of removing plugs from time to time. It ought always to be done, instead of waiting or taking the risk of alveolar abscess. Every one knows the stench which accompanies the removal of a plug when the parts are in a state of irritation. The contents of a root of a tooth, under such circumstances, change litmus instantly, showing their extreme acrid and consequently irritating character. The root canal is the proper source of relief to a tooth and its surrounding tissues under all circumstances. Leeching will often unload the engorged blood-vessels; but counter-irritation is of no use. We do not propose to go into details, which every one's own judgment will decide when the leading principles are understood. When it is believed that pus has formed at the end of a root, an *alveolar* abscess exists, no matter how small, it is necessary, as a matter of course, to remove a plug from a tooth, to tap off the pus in the incipient stage of the abscess, and relief is at once afforded, and perhaps in a few days the tooth can be refilled without any further treatment. When treatment is necessary, creosote passed down the root as far as possible is, perhaps, as good a remedy as can well be used, although iodine and other remedies are used. When true alveolar abscess is complicated with abscess in the surrounding parts, the gums, it aids the treatment by removing the plug from the root, so as to treat the parts from within as well as from without. This part of the subject we will leave to others to discuss, or a special paper, as it is not necessarily connected with toothache, the subject we originally set out to treat of. This will end our articles on the treatment of toothache.

DENTAL STUDIES.

BY WM. H. ATKINSON, M. D.

Read before the Society of Dental Surgeons of New York, September 28, 1864.

To define that which properly constitutes dental study, would be to portray all that pertains to the creation, germination, development, and decadence of the teeth. He who shall prove himself able to do this, will have presented us with an epitome of knowledge and practice in which is comprehended the principles and detail of the herculean work of first understanding the principles and problems involved, and then pointing out the procedure whose prosecution embraces the preservation of sound and the restoration of unsound teeth, as well as the substitution of artificial teeth where the natural organs are wanting.

Efficiently to accomplish this work, we must be content to take a step at a time, laying our foundation upon the secure rock of natural plan, which must first be discovered and delineated so as to be recognized as a standard to which to bring all our facts of detail for proof and correction in the proper correlation of parts. Until this has been attained, there is no certainty to our apprehensions of principles or facts.

It is the absence of a knowledge of *nature's plan of being* that has so potently held at bay the most astute powers of all naturalists up to the present time, and deprived the world of anything worthy of the name of natural philosophy or a complete natural history.

All that has yet been attained and recorded is but fragmentary, and hence the whole world full of workers are in a measure working against instead of *for* and *with* each other, as they inevitably will, the moment the general plan becomes clearly revealed, so as to be capable of quick and clear demonstration to every impetuous inquiring novice, who holds that he is able to grasp the vastest problems within the range of sentient conception.

All generalization has specialty, without which it has no existence, and all specialty of study or work is also divided up into more minute and circumscribed domains, the intimate detail of which must be apprehended and comprehended to enable us to apportion each item to its proper place and position, to construct that which we denominate a specialty or generalization of items into a system, whose perfection is measured by the completeness of its parts and the regularity of their correlations. Bodies are whole, or fractional, according to the light in which they are viewed; and these meet us at every step in our progress of study and endeavor, to comprehend the significance of our dental studies as a whole and as a part of the great philosophy of being, which must ever remain imperfectly defined in our minds, without that which pertains to the dental department.

Our alphabet of first principles can no more be ignored than the dots, lines, and pothooks in penmanship, or the representatives of simple sounds in written words; they are basal and imperatively necessary, and the sooner we agree upon them, and put them to legitimate use, the quicker will we see, eye to eye, and become the propounders of the dental part of the great symphony of universal organology!

So soon as we shall have been enabled to enter upon the plane of pure idea in our studies, there will cease to be difference among us as to the significance and importance of ideas.

It is the invention of imperfect vehicles to convey ideas that has given us trouble and so retarded our illumination and progress. This, like the confounding of language of old, tends to separate us and keep us asunder in all our efforts at dental study. Diverse alphabets are indications of diversity of written and spoken *language*, but not of the ideas that language essays to communicate.

So diversity of our dental nomenclature embarrasses and retards our conjoint progress in our dental studies. Study is properly the work of individual mind to attain the object of desire, and that is the possession of knowledge rather than material wealth; the wealth of the mind as opposed to material or exchange value. This mental, like mineral wealth, hid away in mines in the bowels of the earth, must be worked, divided, and distributed, to become commercial material substance, capable of individual use and benefit.

This division is the work of teaching the uninformed, and practically applying the matters of knowledge to the use and behoof of those in need, who shall thus individually reap the benefits of such service in their own persons or for those of whom they have the charge to rear and educate in accordance with the beneficent plan of individual and associate being.

In all cases where study and due preparation have not preceded practice, the result has proved that the dentist (or other person) so engaged has done mischief by rule, and good by fortuity of ever-varying circumstances.

Professional proportion of character and ability is always in exact relation to the fitness and preparation we make for clear conception and clean performance of the particular function we assume to execute.

In view of all this, what then shall be our simplest division of dental primates, the complete understanding of and familiarity with which shall constitute our dental studies?

Answer: 1. Type; 2. Soft, and 3. Hard part; which last is subdivided into three still more differentiated portions or bodies, which together constitute the *hard* part of the tooth proper, viz.: 1. Cement. 2. Dentine. 3. Enamel. Now each fractional part has a specific type as well as the aggregate of these, which with the soft constitute the tooth a whole organ of the masticatory apparatus of the mammal.

Type holds the relation to *tooth* that *idea* does to *language*. *Type* itself being complex, or simple, according to the aspect in which it is viewed, as pertaining to the pulp, cement, dentine, and enamel, in separate or in combined capacity.

In the true type of tooth tissue, we have the synonym of all typical configuration in its most simple, or indifferent, or free state, at which time it is none other than a sphere or primal drop, holding within itself all the possibilities of transmutation of all morphological proportions.

Type begins, to our apprehension, in the atom (an ideal body) and extends itself to all the modifications of the specific (different) cells of the various tooth tissues, just as far as it finds enabling circumstances to express itself in bodily shape and material presence to our sentient or perceptive ability.

All this is inspirationally and philosophically perceived, though oftentimes it is empirically attained and correlated through adventitious helps,

as enabling circumstances, such as minute dissections and microscopic examinations, to polarize the brain, giving mental tension, favoring influx of light and knowledge.

It is now plain that each atom must have character and circumstance of sufficient diversity to constitute it an individual different from all indifferent or amorphous homogeneous unpronounced substance, mere chaos of matter. Just what this difference of character and circumstance is, will not be apparent to us until we shall have attained the mental clarity necessary to perception of pure ideas, primal or ultimate, independent of the material symbolical presence necessary to what we call vision or sight.

When these primates shall have become absolutely perfect in all pertaining to them as bodies, we may look for perfect cells, tissues, organs, and systems, which are but the regular correlations of these. In such systems (of teeth or other forms of perfect body) we may rationally look for typical, and consequently functional perfection, from whose obedience to the law of their being we may take courage, and hope for our own future perfection of development, in agreement with type and aspiration, for unmeasurable bliss in completest rotundity of being!

A CASE IN PRACTICE.

BY E. W. FOSTER, DENTIST.

FRIEND R. (of full habit, sanguine bilious temperament, middle aged) consulted us last May, (1864,) with regard to two fistulous openings, one of which had emptied its fetid contents into the mouth for nearly *ten years*, near the centre, and back part of the palatine arch. The other, and lesser fistula, had, for about five years, been weeping from the socket formerly occupied by the right superior lateral incisor, a part of which root had remained in the socket. The cause of this abscess was apparent enough, alveolo-dental irritation; the other lateral (left) was found to be the cause of the other. I may add that this tooth (left lateral) had been filled over an exposed nerve some ten years before, and for some time afterward was the centre of violent inflammation and suppuration, but these finally wore away, and the tooth gave no particular trouble afterward.

It was decided to extract this tooth, which was done, when there followed a considerable quantity of insufferably offensive pus, as in the case of the root of the other lateral, which was extracted at this time. Over the root of the right lateral extracted, was discovered an irregular carious cavity, about the size of a small hickory-nut. Unconnected with this, and lying over the opposite lateral incisor, was found a much larger cavity, connecting itself with the antrum. This was the state of the case

last May. The smaller opening, after a treatment of three months, was healed up soundly, and the interior grown up with a beautiful new bony deposit. The other, larger and older difficulty, presents, after a treatment of six months, nearly the same aspect.

The treatment was conducted something as follows: Both cavities were thoroughly syringed out with tepid water, to which was added a small quantity of creosote. The next day several drops of iodine, with the same amount of creosote, were added to something like a fluidounce of myrrh, and this thrown well into the cavities. A light and temperate diet advised. Air was excluded by pellets of lint in either orifice of the cavities. After a few weeks, a change was made in the topical application, by substituting a wash made of one part glycerin to three parts tinct. myrrh, with a slight coloring of iodine. This was continued with general punctuality to the end, with the most happy effects. The glycerin was found to perform all that was claimed for it as a soothing demulcent application. This was added to the tinct. of myrrh, because it was desirable to liquefy the glycerin, also to charge the compound with the peculiar stimulating properties of gum. Iodine was added to excite the morbid condition of the carious bone and secretions.

It is, we find, most powerful as an excitant to vital actions, especially in the absorbent and glandular systems. In too great a quantity, it will act as a corrosive or irritant. In the proportion named, its full power as a tonic was called out.

"It acts by passing into the circulation, or at least," says Dr. George B. Wood, "it always enters into the secretions."

The treatment is presented as condensed as possible. Of course specific directions cannot fully be laid down for such cases. The treatment is left, in a great measure, to our best judgment, and what knowledge we have of pathology and therapeutics. Remove the cause or causes in such cases, keep the blood from spirituous stimulants, the stomach and intestines in their normal habits, and with the application of such suitable medicaments as will still further *invite* nature to more earnest labor, success so desirable will be probable.

SHELburne Falls, Mass., Oct. 1864.

A VASCULAR TUMOR.

BY H. MEREDITH WHITE, M.D., A.M.

J. F., aged 41, called on the 22d September, having a vascular tumor situated between the lateral incisor and canine roots of the right superior maxilla. It was a half inch wide and about as long, and a quarter of an inch thick, soft, purple, and very vascular, and attached by a small pedicle to the place named; the gum in the vicinity was much reddened;

the tumor, by pressure between the thumb and fingers, became of a white color, and diminished in size. When the pressure was removed, it immediately became filled with blood; the pulsations could be distinctly seen; it seemed to be made of a network of arteries and veins. A waxed ligature was tied around the pedicle. In one and a half days the tumor dropped off, and presented a white appearance. The patient was seen on the 27th September, and the remainder of the pedicle well cauterized with nitrate of silver, and the fragment of the lateral incisor's root removed. On the 30th, the parts were much improved and considerable contraction in the part cauterized, the blood-vessels being apparently of the natural size. An incision about a half inch in depth was made in the place, and well cauterized to the bottom of the wound. The patient was seen on the 15th October; the part presented apparently a healthy appearance. The patient was discharged. The root of the eye tooth was allowed to remain. The central incisor of the right side was dead, and had a small abscess at the end of the root; but, as it did not appear to be in any way connected with the case, it was not removed. The point of the root of the lateral incisor had been exposed through the gum for some time, the patient said, and he had smoothed it off with an awl to prevent it from irritating the lip. Doubtless the excessive irritation of the periosteum caused this growth, with which it had connection, and, on account of the deep situation of the pedicle, some of the branches of the anterior dental artery nourished it, and probably grew excessively themselves to form such a pulsating sac. According to Erichsen, "Epulis is a tumor of a fibrous character, springing from the periosteum and edge of the alveolus, and implicating the osseous walls, growing up between and loosening the neighboring teeth, which it displaces and envelops in its structure." "This tumor is red, smooth, and lobulated, etc." "It appears simply to be a circumscribed hypertrophy of the gum." The treatment "consists in the removal of the whole mass and that portion of the alveolus from which it springs." Secondly, he mentions, "cancerous ulcers and fungous growths from the alveolar processes, *malignant epulis*, as they are called, occur in the same way as the last; but they are soft, purplish, very vascular, grow rapidly, and are speedily reproduced after removal," etc.; the same operation required as above. According to Tomes on Epulis, "three varieties may be noted: first, those which are composed of fibrous tissue, intermixed with fibroplastic cells; secondly, those which are mainly composed of the elastic fibrous tissue, the individual fibres of which, like those of yellow elastic tissue, are tolerably uniform in size, curl up when divided, and remain uninfluenced by the action of acetic acid; thirdly, those composed of myeloid cells." The latter, he says, has been described by Mr. Hutchinson. Further on, he relates a vascular tumor, growing between the front teeth, and bleeding when touched by the tooth-brush, etc. The

treatment he recommends for the first three is excision, being sure to remove the part from which they arise; for the last, he applies tannin. The tumor above related had a distinct raphæ, and presented an appearance somewhat like the testes. It had been of three years' growth, according to the testimony of the patient, and seems to be of an unusual character, and may be classed among the benign vascular tumors, and occurring in an infrequent place. In perusing several surgical and medical works, nothing, as yet, has met my eye coinciding with the tumor.

ORIGIN AND DEVELOPMENT OF DENTAL TISSUES.

BY WM. H. ATKINSON, M.D.

Read before the Society of Dental Surgeons of the City of New York, Nov. 23, 1864.

ADEQUATELY to investigate and comprehensively to pronounce even the basal aphorisms included in this short sentence, so as to be usefully and clearly apprehended by the earnest inquirer for the true basis of organology, demands not only the best powers of the best cultivator of biological science, but the concentration of all the powers of all the observers in all of the past and present, if not a distant future, to complete the correlation upon which the demonstration depends. For, to satisfactorily understand the origin of the germs of mammalian teeth, demands of us clear elucidation of the origin of the being, of which the granules, cells, grooves, follicles, sacs, and membranes are but the machinery by whose consentaneous action these are produced and developed to states of utility in the system, of which they constitute but one inconsiderable portion.

So, if we shall succeed in intelligibly tracing this epitome of "all things planetary" (which it really is) from its non-existent, through its chaotic to its highest organic state, its fulfillment of completest function, and decadence and disintegration, we shall have marked out in its biography the great processes suggestive of the laws which point out and prove the philosophy and principles by which not only these insignificant little bodies are evolved, nourished, and destroyed, but the exact rôles of all planets peopling infinite space, whose origin, attractions, repulsions, decadence, and death produce the grand diapason of the "music of the spheres." In one word, he who is able to comprehend the origin, development, and death of a single infinitesimal cell, has the gamut by which to unravel and distinctly read, in the open vision of the realms of space and duration, the various aggregations of these units, in planets, worlds, and spheres, which all live and move and have their being in the infinite living cell or sphere by whom they consist in one harmonious whole.

The moment we inquire for the "*origin*" of any body that has demon-

strable, material existence, we are forced to consider it in at least two aspects, viz.: 1st, that of *size*, or its spacie aspect; and 2d, that of its *duration*, or its tempic aspect. But *ideal* bodies partake so of infinity in attribute, that they seem to ignore both time and space, and hence may be indefinitely multiplied to the utmost capacity of the mind to conceive and perceive them.

The great crux for solution is to account for the origin of the query or suggestion that arises in the mind. So soon as this portal to apprehension and comprehension shall have been well opened, all that remains is careful following up of the series of suggestions, as they are presented, to that which we denominate the use. These series or chains of ideas are divided into regular and irregular, or "natural" and "arbitrary association."

In the strictness of terminology, there can be no "*unnatural* association" of ideas; for natural simply signifies the order in which they are born into the sentiency which cognizes them; and hence all trains of ideas, thoughts, opinions, beliefs, and demonstrations of matters of knowledge must be *natural* to each mind in which they find lodgment.

That which has been deemed "natural" and "regular," was simply the order of presentment to the mind of him who held the relation of teacher to other pioneers in the chaotic accumulation of ideas which they were endeavoring to reduce to definite order and limit, out of which to evoke a code or science acceptable to all others in search of knowledge.

It will not take us long to perceive that, in the nature of things, this is impossible; for a *demonstration* is such, in degree of clearness and extent, to the exact ratio of the illumination and strength of perception in him who sees it. The higher the development of mental power and its culture in expression, the more satisfactory will be the correlation of facts which constitute demonstration. So even the vauntedly "*certain*" and irrefragably "*definite*" and "*conclusive*" character of *demonstration* vanishes into thin air in the presence of the higher certainty of ideal demonstration, which indeed all demonstration is, in so far as it is worthy of the name. Just in the degree of its elevation toward the purely ideal, as opposed to the "material" or "practical" of the schools, must it take rank.

The simple memorizing of the formulæ of teachers may enable one to pass a respectable examination, so long as it goes not beyond set phrases and trite axiomatic expressions in the *words* of the masters; but to satisfy the mind with answers to "questions put to ourselves," as we sometimes are entrapped into saying, requires that we comprehend the extent of demonstration contemplated in the query, or it cannot become "*our own knowledge*;" it remains but the iteration of mechanically memorized *words* in cabalistic phrase, not penetrating the inner vital ideal presence, for whose pronunciation they were brought together.

So, if we would comprehend the origin and formation of the teeth, it is of the first consequence to us to have a uniform standard to which to refer all our acquisitions in fact and philosophy. This standard once fully in possession, we are prepared to make our observations in the whole realm of individualized bodies, simple or complicated. After we have satisfied ourselves with repeated observations and proving, we are ready to dogmatize formularies and improvise symbols of elucidation, to help our fellows up the acclivity of comprehension of the great truth, that "all things differ but in degree," and that "everything is the product of an infinite and infinitesimal worker," from the largest to the least, from the minutest animalcular cell, or smallest diatom in the sea, or simplest needle-shaped crystal known to the mineral kingdom, to the greatest aggregation of these types of the three so-called kingdoms in planetary bodies, represented in actual mass and provable presence, in the mineral, vegetable, and animal modes of dominion over material substance.

To chemistry and microscopy we are chiefly indebted for our means of proof of the character and existence of the elementary bodies that enter into and constitute teeth, from the simplest filamentous tissue that performs the function of and is a tooth, to the most complicated and best organized tooth known to the whole range of dental structures.

Without a knowledge of chemistry, the great organizer oxygen would quite elude our grasp; and were it not for the microscope, we should be utterly unable to prove our best and brightest apprehensions of the primal structures, whose due formation, growth, and continued nutrition supply and keep us in felicitous possession of these invaluable and too little esteemed organs of prehension, mastication, and intelligible articulation of voice and purpose.

The first change of the mucous membrane preparatory to the formation of germs of teeth that has been "*seen*," is a granular accumulation *within* the membrane, at the site of the future papilla. Whether these granules are cells in embryo or not, has not yet been satisfactorily made out, settled, and proved; neither is it certain whether they are *within* or *without* the mucous membrane proper. Cases are recorded of such a character as to favor sometimes the sub-basement-membrane-development theory, and at others the peripheral-proliferation-of-cells, or development independent of any inclosing structure, absolutely without the least vascular connection whatever,—using the term vascular with reference to blood-vessels proper, as understood by all physiologists, who have confined themselves to *formed* rather than to *forming* tissues and organs.

That there is a sort of quasi (outside) connection of all tissue with all the cells of living bodies, is easy of apprehension, and will be denied by none. But that there is immediate supply from the general circulation into the cells, from which the hard parts of the teeth are built up, until after calcification has progressed so far as to have laid the foundation of

the future crown of the tooth, has not been shown to exist. In fact, the body of the pulp itself seems to be formed, like a *foetus in utero*, in an ovoid mass without limbs, within its membranes, and far from capillaries capable of carrying red or even white blood, which are any part of the circulatory system of the *foetus* in the one instance, or the pulp in the other. To be sure, the calcigerous wall surrounding the pulp and intervening between the network of vessels in it and the ramification of the arterioles and venioles, which are so richly supplied to it from the cardiac side of this placenta, so to speak, is in direct communication with the unmodified blood of the systemic circulation. But the circulation in the body of the pulp, from which the crown of the tooth is developed, is in the condition of the circulation in the "*membrana putaminis*" of the chick, carried on by a sort of local territorial circulatory power, analogous to the currents of blood in the "*dermatozoa*," (skin animals,) without anything that would be recognized or acknowledged to be a heart. Now the difference of the disposition made of the *membrana putaminis* in the oviparous creatures and the placenta of mammals, and this placental wall or intermedium of circulatory supply to embryo teeth, is that, in the first and second instances, they are rejected in toto from the bodies of both parent and offspring, while, in the case of the same organ that supplies the tooth, only a metamorphosis takes place, by which this deciduous structure becomes a permanent wall of alveolus, surrounding the roots of its ward, not willing to abandon it to its own resources or the doubtful charity of those into whose charge the helpless little thing might fall; and to this continued relation we are indebted for the retention of the teeth in position where it is possible to nourish and maintain them in vigorous use.

Every known body, from the simplest crystal or filament to a complete planet or world, originates in a *solution* of elements, which are brought into organized relations by an *unseen* type, of specific character and proportions. So that the origin of type itself is involved in the inquiry for elucidation of the origin of the body, which can have no existence without the pre-existent presence of that which determines the character, size, and relative proportions of elemental combination of primates, which constitute and limit it to individual body.

This type is called the organizing force, whose form and proportion is proved to be a verity, *after* it has found means to symbolize itself, by constructing material habitat commensurate with all its desire and purpose to enjoy finited existence in individual segregate function.

I trust it is now apparent that the origin of all bodies, and consequently the teeth, depends upon the coming together of the constituents composing them, but the manner of this "formation of teeth" must be reserved for a future effort.

GUTTA-PERCHA IMPRESSIONS.

BY O. A. J.

A WRITER in the DENTAL COSMOS for September, says: "It must be filled immediately after taking the impression, as it shrinks rapidly in cooling." Query; how much colder would it get if left six months, than it is by the time the cold wet plaster is put into it?

Beg pardon. But pity it is that a material so much cleaner; more agreeable for patient and dentist; so much more readily prepared and applied; that can be washed *ad infinitum*, even without soap; and so much more reliable in all but the most favorable cases, should meet with so little favor and success!

The trouble is that it is taken out and laid down while *soft*, and it *falls*. As found at the depots it is rather stiff and unmanageable, until it has been used a few times, when it is in good condition, and will remain so for a year or more. Put it in boiling water until it is soft all through; then wash and work it under the water, which is all the time getting cooler, until it is not unpleasantly warm for the hands; apply, still wet, to the mouth—don't finger it much there; fan it to cool faster,—when a little stiff, remove, and keep it turning over and over and talking to it under *cold water* until *cold*. That is the secret. Put in the plaster when you please; but to remove it, soften again in hot water.

NEW YORK.

HOW TO KEEP THE JOINTS CLEAN IN RUBBER WORK.

BY O. A. J.

LEAVE them V-shaped when grinding; melt out the wax with boiling hot water, poured on from a kettle spout; pack in a cotton thread with an excavator, being careful to pack the ends over, sure and plenty, pressed into the plaster. The thread keeps ahead of the rubber; it is clean and indestructible. There will be no open space for food and saliva. Silix, plaster, chalk, and everything of that kind will break up and let the rubber pass.

By seven years' constant use I have proved that there is absolutely no failure if the above directions are observed.

NEW YORK.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF
PENNSYLVANIA.

REPORTED FOR THE DENTAL COSMOS BY R. J. HOFFNER, D.D.S.

A MONTHLY meeting of the Odontographic Society was held Tuesday evening, November 1st, at the Philadelphia Dental College, Vice-President Dr. William Gorges in the chair.

The essayist for the evening having omitted to send his communication, the subject of the cause and effect of dental irregularity was selected as a theme for discussion.

Dr. Flagg proposed, in the absence of the regular essay, that the causes of irregularity pertaining to the second denture should be considered; and this being declared in order, he said that in opening the subject he should not expect to present his views in the systematic manner which would naturally result from the preparation of an essay, but would rather endeavor to speak to one or more points in a concise manner, and leave it to others either to favor or combat what he might urge, or eliminate other points of interest, as they might deem best. He would state that he believed, from observation in this direction, that the unprecedented intermingling of all other nationalities, which had resulted in that peculiar race inhabiting the United States, had also given rise to much that we were called upon to rectify in connection with dental irregularity. He would contrast the large teeth and fully developed jaws of the German with the smaller teeth and maxillæ which pertained to the natives of some of the French and Spanish provinces, and would ask if it were strange that the progeny of such parentage should possess the spreading, separate teeth which formed so unsightly a denture, or the crowded condition which bade complete defiance to any arrangement which in form could be styled an "arch." If he were to give the cause of irregularity, he should be constrained to accord this *intermixing of races* a most prominent position.

Many gentlemen have been disposed to assign the premature extraction of deciduous teeth as the cause of "want of development" in the structure of the jaws, and consequent crowding of the permanent teeth into abnormal positions. He did not believe that such extractions produced any "want of development," but thought it *inevitably* resulted in such abnormal development of jaw structure as pertained to *one form* of irregularity, viz., that in which we had what were called "tushes." He thought that the practice of extracting deciduous teeth to "make room" could not be too strongly condemned, and viewed the "high authority" which opposed the doctrine of irregularity resulting therefrom as simply

high ignorance! He would state briefly, that if deciduous laterals were removed to make room for permanent centrals, deciduous cuspids to make room for permanent laterals, and deciduous molars to make room for bicuspids, that thus a perfect arch would surely present from the tenth to the thirteenth year, much to the gratification of operator and parents; but the anatomical position of the slowly developing cuspids was such, that when they "made room" for themselves, it was by such presentation as transformed them from the most valuable teeth in the mouth into "tushes."

Who was responsible for this state of things? He would say, most emphatically, *the operator*. It was to prevent this result that he labored to relieve pain in deciduous teeth—that he filled them, and that he *absolutely refused* to extract them, preferring to lose the patient rather than be chargeable with future deformity. He wished to be understood as stating this to be the only form of irregularity which might be regarded as an almost certain sequence of this malpractice; but he believed that other forms *might* be produced, owing to the want of simultaneous eruption of teeth in the superior and inferior jaws. He also believed that these results were due to mechanical influences, arising from the positions of teeth during the progress of development, and to the various "habits" which were, to a certain extent, contracted by almost every individual, and not to any "want of development" in the maxillæ.

Dr. McQuillen remarked that the subject, although unexpected to him, was one which he had thought much about. He would say, prior to presenting his views on this topic, that the dental practitioner, who desired to render the highest order of service to his patient, should possess that thorough familiarity with the science and art of his profession which would enable him, under all circumstances, not only to answer promptly and satisfactorily such questions as intelligent patients very naturally ask, but also to be prepared to discuss any point, relating to theory or practice, with his fellow-practitioners, whether in the presence of many or few, and notwithstanding the unexpected manner in which the discussion may arise. It could not, of course, be expected that one could do justice to all subjects, or treat them, under such circumstances, with the same clearness and ampleness of illustration that a certain period of careful thought and preparation would insure. He should, however, manifest that familiarity with each subject which would carry conviction to the mind of the listener that the speaker knew what he was talking about, and was not engaged in the unprofitable occupation of killing time, or talking for the sake of hearing his own voice. This capability was to be attained, not by getting in the brain, and dealing out on certain occasions, a mass of heterogeneous *facts*, without *order* and a due recognition of the *relation* which one *fact* bears to another, but by systematizing the knowledge obtained, and reducing the mass of *heterogeneous facts* to a *homogeneous*

whole, by classifying and arranging them under proper heads, or establishing their exact relation to great basal principles, which are few in number and easy of remembrance. If, combined with this, the practitioner was in the habit of attending regularly the meetings of a dental society and participating in all the discussions, it would be found that the difficulty of presenting his views in an intelligible manner to others would be materially lessened year after year.

Recurring to the subject of the evening, he was disposed to favor the views advanced, relative to the effects produced on the teeth by the mixing or intermarriage of the different varieties of the five great races into which ethnologists have divided mankind, as it was in accordance with opinions which he had entertained for some time. Of the correctness of these views he would not pretend to decide, as they were not fully matured in his own mind. There was one fact of importance, however, bearing directly on this subject, which he had observed as the result of personal examination, that the *crania* of the Teutonics (the Germans, Swedes, Norwegians, etc.) are almost round, in the majority of cases, when measured by a line running across the frontal and parietal eminences and the superior curved line of the occipital bone; and that the superior maxilla bears an analogous relation in shape, the arch formed by the teeth approximating rather to the arc of a circle than to an ellipsis. The Celts, on the other hand, (the Irish, Scotch, and Welsh,) have, as a general thing, oval crania, when measured in the same manner as the Teutonics, and the teeth correspond, by being arranged in the form of an ellipsis, rather than the arc of a circle. The jaws and teeth of the Teutonics and the Celts are generally well formed and largely developed, and this, no doubt, was greatly owing to the simple, coarse diet on which they live, consisting, as it does, largely of the cereals, which require considerable mastication. Use of a *part* has a tendency to fully *develop it*, and when inordinately exercised, hypertrophy was apt to be the result. This was shown in a decided manner in the muscular system, in the arm of the blacksmith and the leg of the ballet dancer. The increase in size and strength, under such circumstances, was not confined to the muscles alone, but the bones participated in a proportionate enlargement, being larger and stronger, and having a greater proportion of the inorganic constituents than other bones. This was not mere theory, but the result of actual observation and analysis on the part of careful observers. *Inaction*, or *limited use* of a part, on the other hand, results in *atrophy* of that part. This was markedly manifest in the self-inflicted penance of the Fakirs of India, with whom the muscles and bones of the arm, held immovably upwards for years, owing to the peculiar position and perfect inaction which the limb maintains, become reduced to the most attenuated size. The general absence of tone and strength in the muscular and osseous system of sickly or indolent persons was too apparent to demand more than the

mere reference to the fact. That which was true of muscles and bones generally, applied with equal force to the *jaws*. The softened food, prepared for the pampered palates of persons in easy circumstances, demanding as it does little or no masticatory effort, fails to give due exercise to the jaws, and, as a consequence, they frequently fail to reach the normal size. If, under such circumstances, the teeth should be large, was it at all surprising that they should be found crowded or irregular in their arrangement?

He differed most emphatically with Prof. Gross, in the view attributed to him, that the premature extraction of the deciduous teeth was not a cause of irregularity in the permanent set. The fallacy of this position would be apparent when taking into consideration the fact, that the extraction of one or a number of deciduous teeth must exert a decided influence on the nutrition of the part, and hence influence the size of the jaws. This might be due to the shock attendant upon the operation, or to the fact that *jaws* robbed of their teeth would be unable to perform their *duty as masticating organs*; and hence *imperfect development must result from the want of use*. Again, every pathologist would readily admit that the *cicatricial* tissue, which frequently forms as the result of burns, wounds, etc., possesses a contractile power beyond all calculation, and that the most unsightly deformities, and the entire impairment of the function of certain organs, frequently supervene as a consequence. Fingers, hands, arms, feet, and legs, and even the lower jaw, are either rendered entirely useless or their functions seriously impaired by bands of cicatricial tissue. When a deciduous tooth, or a number of these teeth, are extracted, this *cicatricial tissue* was formed, and, beyond a question of doubt, exerts a decided influence on the *shape* and *size* of the *jaws*, and the *arrangement* of the permanent teeth. Reference was then made to the *effects* induced by irregularity of teeth on the *speech* and *appearance* of persons. As these points have appeared heretofore in articles from the speaker, he merely referred to them in the most casual manner.

Dr. Gorges had been particularly struck with the prefatory remarks of Dr. Flagg. He had often observed the peculiarity spoken of regarding the large teeth in small mouths and the small teeth in expanded jaws. He considered irregularity as frequently due to the premature extraction of the milk teeth; and much censure is often to be attached to parents, who, ignorant of what should be done, determine upon the removal of valuable teeth, not knowing their importance. Dentists should be careful not to mind the importunities of those who are ignorant of the nature of the operations to be performed.

Dr. Breen believed that the premature extraction of the deciduous teeth produced contraction of the jaw, and consequent irregularity of the permanent set. He had seen many instances in which this was undoubtedly true.

On motion, adjourned.

NEW YORK SOCIETY OF DENTAL SURGEONS.

October 12, 1864.

BY DR. W. C. HORNE.

DR. W. H. ATKINSON read a paper on the "Qualifications of the Dental Student." He said the dental student is not an apprentice whose chief requirement is skillfulness in the manipulations of a certain handicraft or trade, but, besides and above this, one who has an aptitude for generalizations of philosophical principles, with the ability to deduce therefrom the proper plan of procedure, which shall regulate and remedy aberrations from the normal standard. In view, then, of the high qualifications necessary to an entrance into the dental profession, what should be the term of study required of all those who enter this field of arduous labor? The height of his desire would be, that every dental student, seeking admission to the classes of a dental institution of learning, should possess all the knowledge which is implied in the title of "Doctor of Medicine;" and that he should carry away with him that more complete endowment of collateral science and art which is signified in the degree of D. D. S. Although this might be the desire of every dental faculty in the United States, yet it could not be at present required, owing to the state of education of those who are desirous of entering the field of preparation for the duties and honors of the profession of Dental Surgery. In fact, if this were required of all candidates for election to chairs in the faculties of dental schools, there would be fewer successful candidates than would suffice to supply, not only new schools, but those already in existence. For the present, then, the requirements should be those which he had made of his pupils for the last ten years, namely, to be willing to use their best powers for the attainment of their profession, with the determination to occupy a high rank therein, and to persist in this course, irrespective of the time it might consume to accomplish this high purpose. Also, to agree to take no pupils themselves who will not be ready and willing to take the same obligations. With such students, and such teachers as they are sure to make, we may dismiss all anxieties for the future, and apply ourselves at once to interrogating nature with such earnestness as to compel the disclosure of her procedure in developing, nourishing, and disintegrating the teeth, and thus put us in possession of the knowledge we so much need, for the enlightenment of all who shall hereafter worthily pursue the study of dental science.

Dr. Mills read a short paper on the "Elements of Character necessary to the true Ideal of a Dentist." A good moral character embodies all that is pure and noble in man's nature, and this is indispensable to our ideal. Some may ask, Have we not dentists of fame who lack this attribute? Yes, but their fame is short-lived, for want of this very founda-

tion. A good common-school education (better if classical) will make the student master of his own language, and enable him to speak and write it correctly. This is indispensable; for, if found deficient here, those with whom he comes in contact may deem him equally wanting in a knowledge of his profession. Good manners are welcomed by all, and the poorest address may be improved by cultivation. A good physical development is necessary; when this is not a natural gift, it may be attained by proper exercise in some well-ordered gymnasium. A keen eye, a gentle hand, with firmness of will and singleness of purpose, should enter into his organization. Honesty should be paramount in all business transactions, more regard being paid to faithfulness in performance of duties than to the amount of remuneration. Money not being his highest reward, he looks higher than that. The true dentist loves his profession; this inspires him with zeal to overcome every obstacle. He never tires of study, but is ever finding some new path to explore, and, like the ivy, clings to everything which may help him to climb onward and upward.

Dr. Castle read a paper on the "Education of the Dental Profession," to which it is difficult to do justice in a short report. The doctor adverted to the influence of cheap literature in exciting a desire for knowledge among the masses; and the great benefits derived therefrom in adding to the conveniences and comforts of the people of all lands. In all the appliances made useful in the sciences for various improvements in the arts, American genius stands pre-eminent; and the American dentist may proudly claim for his profession a share of the fame for which our country is distinguished over the civilized world. But there were important parts of knowledge—anatomy and natural philosophy—from which the mass of dentists had received little aid. He doubted the ability of this Society to shine above the erudition and developments of schools established hundreds of years; and yet such extravagant claims had been made and supported by more than one of its members. Dental education is a subject of great importance; it is practical. But what should be said of the extreme views upon the subject—that the art of dentistry requires huge and terrible dimensions of mind and physics, and that, to overwhelm the barriers opposing, we must commence, *ab initio*, with new philosophic trainings of the mind, with metaphysical research, and with "polarized ideas," to be enabled to elucidate the subtle phenomena enveloping our science? How great, then, must be the expansive genius of the American dentist, who conquers such a hydra-headed science of philosophy, mechanics, and erudition, by a leap from the tailor's board, a jump from the dry-goods store; by stalking from the machinist's, the tinman's, or the jeweler's shop; who gives up the razor and lather, and bids farewell to the anvil and horse-shoeing; who ceases to drive the plane or hackney-coach; who repudiates all trades, all arts, and all knowledge of nature's laws, save the law of laboring to obtain

that wherewith to eat, to drink, and to be clothed ! Can the world fail in its admiration due to original genius so gracefully developed ? The mechanical operation of filling teeth with gold being the least laborious and the most profitable, a ridiculous attempt is made to establish this as a specialty of the highest order of dental surgery, in contradistinction to the other more skillful and equally important part. How can we expect dental education to flourish, or even to succeed, when the student is told that the mechanical knowledge necessary to fill a hole in a decayed tooth will produce a fee of from twenty-five to one hundred and fifty dollars ? The mechanical dentist, plodding after stores of medical knowledge for a professional status, may dole away his time in comparative poverty, while the aristocratic tooth-filling "surgeon dentist" rides in wealth. For a knowledge of anatomy, physiology, natural philosophy, and chemistry, the honest foundation of the studies of the medical dental student, he will attend the classes of some one of our excellent medical colleges ; while for a school of dental mechanics our means are as ample as they are perfect. When the student shall have acquired a respectable knowledge of the medical art, in connection with the art of the dentist, he will discover that the permanence of gold fillings in decayed teeth, much as they depend upon the skill and excellence of the operator, are more influenced by disorganizing principles over which he has no control whatever ; notwithstanding that it is gravely asserted before this Society that the progress of the dentist's knowledge will, at no distant day, so control the occult mystery of organization that the dentist's art will become obsolete. Above all, the educated dentist will not be imposed on by interested charlatans, who at one and the same moment extract teeth, cure sore throat, heal consumption and heart disease, eradicate fits, cut corns, and cure syphilis by the mere administration of laughing gas.

October 26, 1864.

Dr. J. S. Latimer read a paper descriptive of his method of filling the right inferior second molar ; the cavity being on the anterior approximal surface, the flow of saliva very abundant. A triangular wedge of orange or other hard wood is inserted between the first and second molars at the necks of the teeth, below the cavity, and started with a few gentle taps of the mallet. The chisel is then employed in cutting down from the grinding surface to the cavity of decay, and then the mallet is resumed ; alternating the two until the necessary space is obtained, occupying fifteen to twenty minutes. The wedge is now cut off. The saliva, becoming troublesome, is removed with a small piece of fine sponge. The cavity is dovetailed at the grinding surface and continued, in about the same shape, down to the cervical wall ; this is cut down to nearly a right angle with the approximal surface, far enough to remove all decay.

If the wedge interferes with the cervical portion of the cavity, it may be cut away with a sharp bur. If the teeth do not admit of wedging, sufficient space may be made with a safe-sided file. All decay being removed, and the cavity properly shaped, the margins of the walls are slightly countersunk with burs and fine files, and the tooth is ready for the second division of the operation. The cavity is now injected with tepid water, the head placed in position, the buccal surfaces of the teeth and the adjacent mucous membrane are wiped dry, and the duct compressors adjusted. These are made of sections of clock-spring, with the ends bent a little, and supplied with gutta-percha pads, one concave, the other convex. The concave pad covers the mouth of the duct of Steno. The saliva is wiped from beneath the tongue, and a napkin of soft muslin, larger at the centre and tapering to the ends, is placed upon the mouth of the sublingual ducts, extending on either side between the teeth and tongue. The patient or assistant is instructed to hold this firmly down. A small napkin is placed next the buccal side of the tooth, and a strip of spunk next the napkins, to indicate the approach of moisture. This is to be done rapidly, to be successful; keeping the cavity and gold perfectly dry is the greatest obstacle to be overcome in filling teeth. The cavity is now wiped dry with muslin or bibulous paper, then touched with creosote and again dried. A loose oblong pellet of non-adhesive gold is now packed into one of the angles formed by the conical and lateral walls, being retained by an instrument in the left hand, and condensed with a two-rowed foot instrument and the mallet. Other pellets are added, until a foundation is laid, and cemented together with one or two well-annealed sections of rope. The pellets, if large, should be passed so quickly through the flame as to cause only the exterior to become annealed. The first layer must be held steadily in its place, and not be permitted to rock in its position. (In many cases retaining points, for holding the first portions of gold *in situ*, are indispensable, and they are always convenient, the gold used being, of course, adhesive.) The cervical portion of the plug made satisfactory, we add another layer of pellets, condensing with a single-row foot instrument, cementing them, as before, with adhesive sections; and so continue, until the cavity is three-fourths full. All this time the filling should be kept well built out toward the adjoining tooth with adhesive gold, which is also made to overlap the lateral walls. The remaining fourth of the plug is entirely built up with annealed sections, condensed with fine points, great care being taken to have the fillings perfect next the walls. When certain that we have added enough and to spare, loose flat plates of foil, well annealed, are laid over the whole, and malleted down, with a small smooth point over the grinding surface, and with a thin burnisher on the approximal surface. This brings us to the third division of the operation, namely, dressing down and finishing. The grinding surface is generally best trimmed with fine burs, varying

from one-sixteenth to one-eighth of an inch in diameter, some of the smaller being ovoid in shape. The approximal surface will be most readily finished with proper files and burnishers. The surface is now dressed down with flour of emery or pumice, followed by calcined buck-horn, and then by calcined rotten-stone, the latter on dry chamois skin. The wedge is now removed and the plug exhibited. In using Wood's metal for such a cavity, it would be about half-filled with tin foil, well malleted in, before commencing the plastering process, as it is almost impossible to fill such cavities well with the fusible metal alone.

Dr. Jarvis read an essay on "Filling Teeth with Gold," accompanied by several specimens of plugs, and an apparatus for heating the gold, and retaining it at an even temperature, while operating. The following is an outline of his paper: There are two things necessary in filling a tooth: first, that the plug shall be so condensed against the walls of the cavity as to effectually exclude air and moisture; second, that the face of the filling shall be so hardened and finished as to retain its position and condition. This can be accomplished by two processes, one of which (wedging) is certain, the other (welding)—just a little foggy. The wedging process is always reliable, where skillfully performed, with any kind of sponge gold or foil that will not crumble in manipulating; using the gold in small pieces, with finely serrated instruments, by hand-pressure or under the mallet. There are some dentists who are under the impression that they are welding gold in the teeth; the thing is an utter impossibility, a delusion. Fillings have been passed between the rollers, or beaten out under the hammer, but in all cases they were first subjected to the flame of a blow-pipe; that was the *only* essential feature. Webster defines welding as "the act or process of uniting by intense heat." In the case of gold we may modify that definition a little,—the doctor believing that he had effected a good weld at two hundred degrees of heat—not in the mouth, but in a cavity in a piece of steel. The gold was Watts' No. 4, adhesive, packed in small pieces, under heavier blows of the mallet than a tooth would bear. The plug weighed $6\frac{3}{4}$ grains. Another, of White's No. 2, sponge, without heat, and one hundred and sixty-five blows of a mallet, much harder than a tooth would bear; weight $6\frac{3}{2}$ grains. One of White's No. 6 foil, packed by hand; weight $6\frac{1}{2}$ grains. Another plug, packed wet, under the mallet, of White's No. 6 foil, weighed $5\frac{2}{3}$ grains. The plugs all made in the same cavity above mentioned. The last will much more readily fall in pieces, and will afford *no* support to the tooth, though it will just as effectually preserve it; with this exception, that the surface is sure to break up when exposed to wear and tear. Having denied that there was any welding in the cohesion of particles of annealed gold foil, the doctor proceeded to describe the wedging process; consisting in keeping the sides of the filling built up higher than the centre, and pressing the instrument in a direction from the centre of the

cavity, in crown filling; then every successive piece of gold is firmly held by and holds the former. By a simple apparatus, consisting of a cylinder of brass plate, freely perforated, set over an alcohol lamp, with a platform on the top for gold, another metallic plate intervening between the plate and the platform, the gold is kept at any desired temperature higher than that of the breath, thus effectually preventing the condensation of moisture on the gold when it is carried into the mouth.

CONNECTICUT STATE DENTAL ASSOCIATION.

A CONVENTION of the dentists of Connecticut, held at Hartford, October 20th, 1864, resulted in the formation of a State Society under the above name, with the following list of officers:—

President.—Dr. A. Hill, of Norwalk.

Vice-President.—Dr. W. W. Sheffield, of New London.

Recording Secretary.—Dr. Jas. McManus, of Hartford.

Corresponding Secretary.—Dr. Leroy D. Pelton, of Hartford.

Treasurer.—Dr. E. E. Crofoot, of Hartford.

Librarian.—Dr. Chas. P. Graham, of Middletown.

Executive Committee.—Drs. Mallett, Metcalf, and Stevens, of New Haven.

Dr. Hill, on taking the chair, delivered a neat address, from which we make the following extract:—

In my judgment, gentlemen, the organization of this Society is the commencement of an era of much importance in the history of the dental profession in our State. It is an event which I have long desired to see accomplished, and in which I am delighted to participate.

We have been left far in the background by our sister States in this respect. Even the younger States of the West, and the far-off Mississippi valley, are far in advance of us, having their State and county organizations all over that extended region.

As a profession, we have suffered great loss, and have labored under many disadvantages for the want of such professional and social intercourse as these associations are best fitted to supply. Mutual shyness and disreputable jealousies have been the offspring of this lack of fellowship. And we have been wont to regard each other with distrust, simply because we did not know each other better. But our meeting to-day gives promise of a change, as auspicious as the most sanguine would dare to anticipate.

I confess myself most happily disappointed in the number and spirit of those who have convened on this occasion. The different portions of our State are well represented, showing how deeply they are interested in

the organization of this Society. And I am delighted as well with the *spirit* as with the *numbers* here present.

A thousand nameless advantages will accrue to us, if, in the true spirit of our noble profession, we zealously unite in contributing our individual quotas to maintain and perpetuate the interest of such associations.

Let us resolutely purpose that this Society shall be a model one of its kind, lacking no element that can either ennoble the profession or bless the community in which we live.

The subject of hard rubber patents was discussed, and the following resolutions adopted:—

Resolved, That the limited state of information on the subject of hard rubber patents, renders it inexpedient for us at present to purchase licenses to use it.

Resolved, That we, the members of this Association, hold ourselves in readiness to contribute the sum of ten dollars each to the *Boston Protective Union*, for the purpose of defense against prosecution for using the hard rubber base for artificial teeth, whenever in the judgment of the Executive Committee it shall be deemed expedient. Adopted.

The Association holds its first annual meeting, at Hartford, on the third Tuesday of May, 1865.

MERRIMACK VALLEY DENTAL ASSOCIATION.

BY G. A. GERRY.

THE annual meeting of the Merrimack Valley Dental Association was held November 3d, at Manchester, N. H.

The following named gentlemen were elected officers for the ensuing year:—

President.—A. Lawrence, M. D., of Lowell.

Vice-Presidents.—D. K. Bouelle, of Manchester; Dr. E. G. Cummings, of Concord.

Recording Secretary.—Dr. G. A. Gerry, of Lowell.

Corresponding Secretary.—Dr. L. F. Locke, of Nashua.

Treasurer.—Dr. S. Lawrence, of Lowell.

Librarian.—Dr. G. A. Gerry, of Lowell.

Executive Committee.—Drs. C. Heath, of Manchester; D. T. Porter, of Lawrence; A. Lull, of Nashua; S. L. Ward, of Lowell; E. G. Cummings, of Concord.

Dr. I. J. Wetherbee, of Boston, was unanimously elected an honorary member.

Drs. A. Lull, of Nashua, and W. P. Kelley, of Franklin, were admitted as members.

The following resolution, offered by Dr. Gerry, was unanimously adopted:—

Resolved, That it is the duty of every dental practitioner to patronize no man or firm, who is connected in any manner with companies or individuals who are attempting unjustly to claim of them remuneration for so-called patents.

Dr. Wood introduced the following, which was adopted :—

Resolved, That the Merrimack Valley Association of Dental Surgeons heartily approve of the formation of a United States Dental Protective Union, and we pledge it our united support, and recommend it to the favorable consideration of the profession generally.

Adjourned to meet at Lawrence, Mass., on the first Thursday in May.

EDITORIAL.

SENSITIVE DENTINE—ARSENIC, AND THE TREATMENT OF THE DENTAL PULP.

THERE is nothing more left but to tell how I use arsenic. This is my original prescription :—

R.—Arsenious acid, gr. xxx;
 Morphiæ sulphas, gr. xx;
 Creosote, q. s.
 Misce.

Put the arsenic and creosote into a glazed mortar, and grind them until the arsenic becomes impalpable, adding creosote, as it may be required, to keep the mixture of the consistency of cream. Not only is the arsenic thus finely powdered, but a large amount is rendered soluble. After it has been ground for two or three hours, add the sulph. morphia and more creosote, sufficient to dissolve the morphia and to create a paste. This paste is applied to the pulp of a tooth, and, if possible, after it has been freely laid bare; but if the pulp cannot be entirely exposed from extreme sensibility of the parts or nervousness of the patient, place it in the cavity with a small lock of cotton, about as large as a large pin's head. Let this remain twenty-four hours, thirty-six, or forty-eight, as the case may be—not from one to four weeks, as that would afford time for the arsenic to be diffused through the tooth and inflame the external membranes and gum, as every one of sense now knows that tooth-bone is a living tissue, connected by its membranes to the jaw and gums. No one but an ignoramus or madman would let it remain indefinitely. This pellet of cotton I secure with a piece large enough to completely fill the external cavity. If the cotton cannot be retained by an adjoining tooth, shape the cavity by cutting around the edges, so that soft beeswax can be applied on cotton. Other substances are used to secure the paste; but I succeed with either of the above named. I kept a record of one

hundred cases in the spring of 1842, which I gave in my thesis, and noted the amount of pain experienced. Eighty-four cases gave no pain; sixteen gave pain,—the average duration of which was only one hour. The greatest pain was experienced in the nervo-sanguine temperaments, and recently exposed nerves. Nerves that have been exposed for some time are destroyed without pain, as a rule. The first impression of the paste is to excite irritation, until enough is absorbed to devitalize the part. In some it produces pain, and in others only a warm sensation. When I meet the patient, after the paste has been applied, I remove as much of the pulp as possible, and the sooner this can be done the better, after a considerable amount of it has been destroyed, as it will be less painful before inflammation of the part *not* destroyed down the root has set in. The pulp will be found to be highly engorged with blood, and blackened, and still apparently sensitive. In such a case puncture the pulp, to cause bleeding, and the part will cease to be tender. I do not apply, as a rule, the paste a second time until all bleeding subsides. It is better to wait a few days to see how much of the pulp will yield to the effect of the paste. Now, it does not seem worth while to give any precautions to a dentist when using so deadly a poison as the above; but, as cases of mischief are frequently occurring among well-informed operators, precaution is necessary. The paste should not be allowed to get in contact with the gum, as it will destroy it and the margin of the alveolus between the teeth; and, when applied on the labial and buccal surfaces, it should be well secured, or it will produce deep excoriations of the cheeks or lips; and, when it is applied between the teeth, see that the opposite tooth is sound. If it has a cavity in it, the arsenic will travel through the cotton, pass into the cavity, and kill or inflame the pulp of it. If the neck of the tooth be denuded, it will even be absorbed by the dentine and do mischief. This was the manner in which the pulp was inflamed in the tooth I spoke of some time ago, which seemed to give Dr. Hawes so much trouble to explain. A case occurred a short time since in the practice of a neighboring dentist, who was somewhat familiar with the use of the paste. He destroyed the pulp of the right superior molar, front part, and in due time plugged it; but in a short time pain was experienced; the plug was removed, and still the pain continued. The dentist and patient called to consult me. The parts were painful to hot or warm fluids. On examination I found that the neck of the adjoining second bicuspid was denuded and softened, but no apparent cavity; but the denuded portion was readily cut with the excavator. I continued the cutting until I reached the pulp cavity; the pulp was partially dead. This explained the cause of the pain. The dentist did not think such a thing could transpire.

J. D. W.

(To be continued.)

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

PRONOUNCING MEDICAL DICTIONARY. BY J. THOMAS, M.D. PHILADELPHIA: J. B. LIPPINCOTT & Co., PUBLISHERS. 1864. 704 pp.—A new work with the above name has been received from the author, which, in the language of the title-page, is “a comprehensive Medical Dictionary, containing the pronunciation, etymology, and signification of the terms made use of in medicine and the kindred sciences; with an Appendix comprising a complete list of all the more important articles of the *Materia Medica*, arranged according to their medical properties. Also an explanation of the Latin terms occurring in anatomy, pharmacy, etc.; together with the necessary directions for writing Latin prescriptions, etc., etc.”

Few persons have a proper conception of the careful preparation, lengthened experience, *exact*, *varied*, and *extended* knowledge demanded to fit one for the responsible duties devolving upon the lexicographer in compiling a dictionary. The biographies of men who have served the world in this respect reveal the privations and labors of Dr. SAMUEL JOHNSON, while engaged in the arduous and herculean task of preparing the *first reliable* and useful dictionary ever published in the English language; a work which, of itself, was sufficient to immortalize him. The subsequent efforts of NOAH WEBSTER, who, however much we may object to the impropriety, and indeed folly, of one man attempting to play the part of a dictator, and *decide* the *orthography* and *orthoepy* of words on his own personal responsibility, rather than performing as he should the part of a faithful chronicler, who places on record the *usage* prevailing among the educated minds employing the language as a mother tongue,—even with this drawback, produced a great work, received in many respects as unquestioned authority, and which will continue to be so, no doubt, for generations to come, and will stand as an enduring monument, bearing testimony to his vast knowledge and his life devotion to philology. The still later, eminently valuable dictionary of the venerable JOSEPH E. WORCESTER, who, throughout the entire work, gives evidence that he fully appreciated the *duty* of the lexicographer by giving the language as *it is*, not his conceptions of *what it ought to be*, and representing, as the orthography and pronunciation does, the approved usage of our best writers and speakers, is a reliable guide to those who desire to speak and write in accordance with such authority; like the preceding works, it will benefit the world in the future as it has in the present, and carry the

name of its author down to posterity as a man of remarkable erudition, who performed his self-appointed duty in a faithful and eminently useful manner.

Reference has been made to these eminent men to indicate what is demanded on the part of one who assumes or essays to produce a work such as the one under review. A personal acquaintance with the author enables me to say that he has brought to the task, in an eminent degree, as the author of LIPPINCOTT'S PRONOUNCING GAZETTEER OF THE WORLD, that preliminary training, that rich and varied knowledge of philology, which can alone enable one to produce a work that will be serviceable to others and creditable to himself; and superadded to this, the classing, sorting, grouping, comparing, tracing the derivation and usage of words, have been to him no drudgery, but a delight and labor of love. In his anxiety to present a work which should be as near as possible *accurate*, he has not, in doubtful cases, contented himself with merely consulting works of reference, but on many occasions has hunted up, and frequently with much inconvenience to himself, persons devoted to a special line of study or business, whom he very naturally and properly regarded as the parties best prepared to give him correct information, and therefore the most reliable authority in such cases.

This work, prepared under such favorable auspices and with such great care, has been in my possession for several weeks, and subjected to an almost daily examination, sometimes as a matter of critical curiosity, to ascertain whether such and such words were presented, and how pronounced and defined; at other times with the view of obtaining exact information on mooted points; and, as the result of that examination, take pleasure in stating that I regard the work as a most valuable addition to the medical and scientific literature not only of America, but of the world. It is not as large and voluminous as the excellent Medical Dictionary of Prof. Dunglison, as the greatest condensation has been aimed at, by making the definitions as concise as possible; but it is as exact in all particulars, and has the decided advantage of being a *pronouncing dictionary*. It would be folly, however, to institute a comparison between two such admirable works; for they are, each of them, so valuable and indispensable to the man of science that every one who can afford it should possess both of them.

The work has special claims to consideration for the scientific man, on account of the *pronunciation* of medical and scientific terms, and presenting, as it does, the approved *usage* of the best speakers, can be justly regarded as reliable authority on this point. It may not be amiss here to refer to the objections which occasionally have been urged by a few dental writers against the use of *technical terms*, intimating that their employment has a tendency to mystify the subject-matter of an address,

an essay, or an article, and manifesting an air of pedantry on the part of those speakers or writers who employ them. These objections are more *apparent* than *real*, and almost invariably emanate from persons whose acquaintance with science is of the most limited character, and who therefore cannot comprehend or appreciate the importance of employing *exact terms* in the description of scientific *facts*, which shall leave no doubt in the mind of the listener or reader as to the meaning of the speaker or writer. The *terms* employed in science seem *hard* only while the *ideas* which they *represent* are *not understood*. Without learning and understanding the technical terms of a science, that science cannot be comprehended. It has been justly and happily remarked by one of the most eminent scientific men of the age, that "we listen with pleasure and surprise to the glib facility with which the working classes, admitted in homely attire at half price to the Zoological Gardens, talk of the elephant, the rhinoceros, and the hippopotamus. These derivations from the Greek are no harder than the Saxon monosyllabic names of the bear, the seal, or the lion; and yet the four-syllabled and five-syllabled names above cited are longer than the average of the technical terms derived from the same learned and pliable language. When the mind becomes familiar with the things of which these are the verbal signs, they fall naturally and easily into the circulating medium for the currency of thought. To the intelligent reader of every class, who may be blessed with the healthy desire for the attainment of knowledge, let it then be said, Be not dismayed with the array of 'hard words,' which seems to bar your path in its acquisition. *When such words are invented or adopted by the masters in science, be assured that your acquisition and retention of their meaning will be the safest 'first steps in the science of your choice.'*"

It is not enough, however, to become acquainted with the *meaning* of such terms, for their proper *pronunciation* is equally important.

Etymology has received that attention which it justly merits; the author, fully recognizing that the student, by acquiring a knowledge of a comparatively few elements or roots, is thus enabled to determine the signification of a multitude of compound words, and is guarded most effectually against looseness or vagueness of application in the use of scientific terms. Those who have not enjoyed the advantages of a classical education will find the full and clear explanation of Latin phrases very useful to them. There are other portions of the work to which attention might be directed, but time forbids dwelling upon them.

In speaking so favorably of the work, I do not wish to be understood as intimating that it is faultless; few things, if any, that emanate from the hand of man can be said to be perfect. Reference has already been made to what is required on the part of one who undertakes the difficult task of compiling a dictionary. Is it at all surprising that, under such circum-

stances, a few errors should occur, some little matter left out, some slight mistake, originating perchance with the author or the printer? These things are liable to occur even where the greatest care is exercised on the part of author, printer, and proof-reader, singly and combined; and all honest, high-minded reviewers are willing to make due allowance for their occurrence. Candor compels me to confess, however, that after a careful examination of the work, although noting a few points to which exception might be taken, it appears to be signally free from the very decided objections which frequently can be brought against scientific works on this score. The freedom in this particular is no doubt due—in addition to the very great care and solicitude naturally manifested on this point by the author—to the fact of the book having been brought out under the auspices of the excellent house who published it, and whose enviable reputation has been well earned, well deserved, and is world wide.

There is only one word to which I feel called upon to direct attention, on account of its orthography: it is the word DENTINE, which the author spells DENTIN. It is difficult to say whether this mistake originated with the author or printer. Be that as it may, the word is invariably spelled dentine, and originated with Prof. Owen, a *master* in Odontography and General Science, including Philology. This slight mistake, on the principles already referred to, can be easily excused. My object in directing attention to it is more with the view of proving that while fully alive to the many excellencies, and most emphatically indorsing the work, I am not insensible to the existence of a very, very few blemishes, which, however, when viewing the work as a whole, are essentially cast in the shade.

In conclusion, it may be truly said that to the student, just entering upon the study of science, and the man whose *inclinations* and *pleasures* lead him to the pursuit of science with the view of *acquiring* knowledge, that he may enjoy the *gratification* of *imparting* it to others, either as a *public teacher* or as a regular contributor to science as a *writer*, and who desires to speak *correctly* and write *accurately*, this work will be found most *invaluable and indispensable*. The most careful and exact writers are liable to errors of judgment in the use of terms, and there is no better mode of correcting this than to have always at hand and ready for use such a work.

It is only necessary to allude to the fact that the book was published by J. B. Lippincott & Co., for it to be at once admitted that the typography, binding, and general mechanical execution of the work could not be other than as they are—done in the very best manner. The price of the work, in cloth, is \$3.00; in sheep, \$3.50.

DENTAL PATENTS AND PROTECTIVE UNIONS.—On different occasions, during the past two years, circulars have been issued notifying the profession that organizations were to be, or had been formed, in different sections of the country, with the view of testing the *validity* of certain patents, from which the patentees were deriving a large income by sales to the dental profession. These patents have become so numerous of late, and extend in such a variety of directions, that, if increased at the same rate, as appears very probable in a few years, to an inordinate and an indefinite extent, the energies and usefulness of the profession will be hampered so as to materially interfere with its progressive development as a *science* and an *art*.

That any person who makes an improvement in mechanics is entitled to take out a patent and derive all the pecuniary benefit that may accrue from the sale of the same, is a matter settled beyond a question of doubt by the laws of the land; and it matters not how powerful or numerous the combinations may be against a patentee who has a claim which is well founded, the courts will be compelled, and should decide the case in favor of the patentee, according to law; but where the claim has a false foundation, the proof of that would be sufficient to render it null and void.

Admitting, therefore, that every one, professional or non-professional, has a perfect right to take out a patent, and that the custom and commerce of the world sanction and justify the act, there is, aside from this general view of the case, a *professional* or *ethical* side to the question, so far as the taking out of patents on the part of practitioners of dentistry is concerned, which, for the past few years, seems to have been entirely overlooked. In the medical profession, it is not only one of the most marked violations of the code of ethics for a practitioner to take out a patent for a recipe, an instrument, or any other means which may be employed in the alleviation of suffering humanity, but any offender would also lose caste among his fellows, and subject himself to the censorship of such societies as he might belong to, whether local, state, or national. The broad, liberal, and comprehensive axiom, "Freely have ye received, and freely should you give," is universally *recognized, respected, and observed* by reputable medical practitioners all over the world. That which is true of medicine should hold good with the dental profession, for it is engaged in the same beneficent duty, ministering to and alleviating the diseases, pains, and afflictions to which poor suffering humanity is subjected; and the dentist, like the physician, is largely indebted to the unselfish and liberal-minded men who, in the past and the present, have given freely to the profession, finding their reward, not in mere pecuniary compensation, but in the consciousness that they have made some return for the knowledge and advantages which they had gained from those who had preceded

or associated with them. *Protective unions* may be well enough in their way, and, as a *temporary means* of resisting unjust encroachments or taxation on the part of unprincipled men, whether calling themselves dentists or not; but the proper way to strike at the root of the evil is for the various dental societies in the country to take a *firm and decided* stand against any *active member* taking out a patent for anything relating to the practice of dentistry, either mechanical or operative, and that *no practitioner of dentistry* shall be eligible to *active, corresponding, or honorary membership* who shall be engaged in such transactions.

In advancing these views, I do it on my own personal responsibility, without *fear* or *favor*, and as the candid, sober convictions of many years, which the experience and observation of each succeeding year have only tended to strengthen and confirm. They are presented as convictions resting upon great basal principles, having their foundation in the broad and enduring claims of what is called a liberal profession and of suffering humanity. Dentistry, however, cannot truly *secure* and *maintain* the character of a *liberal profession* until it assumes the position that its practitioners shall not take out patents for anything employed by them in the discharge of their professional duties. There are a few interested parties who may oppose such views; but the large body of liberal-minded men in the profession will, no doubt, recognize and fully indorse the justice and correctness of the principles enunciated.

While thus advocating the strict observance of ethical rules on the part of professional men, I do not wish to be understood as applying these principles to non-professional men; they are outside of the profession, and whatever interest some of them may feel in its success, they cannot be considered as coming under the operation of or to be governed by rules which should control those who are engaged as practitioners.

"FIRST ANNOUNCEMENT OF THE NEW YORK INSTITUTE OF DENTAL SCIENCE AND ART.—To meet, in some degree, the demand for dental instruction long felt in this city, the Society of Dental Surgeons of the City of New York and the Brooklyn Dental Association determined to secure a full course of dental tuition for the fall and winter of 1864 and 1865.

"In pursuance of this object the following corps of instructors have been duly elected, who have severally signified their willingness to undertake the arduous work.

"W. H. ATKINSON, M.D., D.D.S., Institutes of Dental Science and Art.

"C. P. FITCH, M.D., Anatomy and Physiology.

"J. S. LATIMER, D.D.S., Operative Dentistry.

"JOHN M. CROWELL, Artificial Dentures and Appliances.

"JOHN ALLEN, D.D.S., Chemistry and Metallurgy.

"The term will begin December 1st, 1864, and continue sixteen weeks. There will be an average of three lectures or demonstrations daily; which,

together with the general and special clinics and demonstrations, will fully occupy the time of the pupil.

"Those wishing to avail themselves of the advantages of this school will call on, or address

"W. H. ATKINSON, *Dean*,

"No. 109 Ninth Street, (West of Broadway,) New York City.

"N. B.—The introductory address will be delivered December 1st, 1864, at 8 P.M., by the Dean."

The announcement above was placed in my hands, but with no further information than is presented therein. Nothing is said as to whether the institution is chartered, and therefore empowered to confer the degree of Doctor of Dental Surgery, where the school is located, and what the means of illustration are. These are points of decided importance, and on which light should have been thrown. Trusting that the institute has a charter and a local habitation, as well as a name, and ample facilities for illustration of the lectures, every one truly interested in dental education and the progressive movements of the profession, will hail with pleasure the advent of this new institution, as a move in the right direction. A large city like New York, claiming to be the metropolis of the Union, with many hundred practitioners of dentistry, counting among them some of the most enlightened, scientific, skillful, and refined members of the profession, should long since have had established in its midst, and in successful operation, a dental college. Some of the gentlemen connected with this institute—Professors Atkinson, Fitch, and Allen—are well known to the profession as earnest, capable men, who have made their mark. The other gentlemen, although less widely known, are, no doubt, from their association with the parties named, well fitted for the responsible positions which they occupy. That the movement may prove a success is the earnest wish of the writer of this; and he, and others who have the best interests of the profession at heart, would be glad to see a dental college in every large city in the Union, satisfied that, if properly conducted, they would not only be liberally supported, but also instrumental in accomplishing a great work for the profession and the community, which can be effected in no other way. In the establishment of a college, it is all-important that the incumbents of the various departments, whether professors or demonstrators, shall not only possess the requisite ability, but also have a special liking for the department over which they preside, and, in addition, be able, when engaged in the discharge of their official duties, to dismiss from their minds all other subjects than that which demands their attention at the time; in other words, effecting that *concentration of mind*, without which little can be accomplished in teaching or serving others in such positions.

DENTAL SOCIETIES IN THE UNITED STATES.

THE following was omitted in the list of Societies published in the November number:—

SUSQUEHANNA DENTAL ASSOCIATION—Meets semi-annually, second Tuesdays of January and July, (next meeting, January 10th. 1865, at Lewisburg, Pa.) *Pres.* J. M. BARRETT, *Rec. Sec.* J. D. WINGATE, *Cor. Sec.* M. D. L. DODSON, Williamsport, Pa.

SELECTIONS.

THE DENTAL REGISTER OF THE WEST—OCTOBER.

"THE SILVER MEDAL.—*Eds. Register:*—The object of this communication is to call the attention of dentists, manufacturers, and inventors to the proposition of the Mississippi Valley Dental Association to award a silver medal to the person making the most valuable *discovery, improvement, or invention* pertaining to dentistry during the present year. I believe that there has not been anything said or written since the publication of the proceedings of the Association on the subject, and unless the exchanges of the *Register* have made mention of the proposition, the probabilities are that very few persons have ever heard that such a prize was to be awarded.

"It is said that the pen is mightier than the sword. Then we want the pen used in our behalf. Tell everybody that the Mississippi Valley Association of Dental Surgeons are offering two medals, one to be worth one hundred dollars, (gold,) for the best essay on Anæsthesia, and the other for the best improvement in anything pertaining to Dentistry.

"It seems to me that all medical and scientific journals, as well as other publications, friendly to the advancement of science and art, should give us their aid in our undertaking. We desire that our profession shall rank A No. 1; to accomplish which requires much sacrifice and labor. Now, what we want is to have the co-operation of the person placing this proposition before those interested. Then we feel no hesitancy in saying, that the committee appointed to make the award will have something before them.

"If I understand the design, it is not to confine the award to any particular branch of dentistry, but to let anything, it matters not what it is, if it is of utility in the profession, come in for consideration. It matters not whether it is a chain or an 'automatic plugger,' a new method of mounting artificial teeth, or a new anæsthetic agent. All are alike of interest to the committee, and of relative value to the profession. This proposition is not confined to those engaged in the dental profession, but is to anybody, whether he be *dentist, physician, or mechanic*. Can't we have the assistance, then, of all those interested in these branches of business?

"The committee are desirous of making this an important item in the proceedings of the next meeting, which is to be held in February next, to which we invite the attention of all the members of the Association and profession. If you want to see something new and useful, come to

the next meeting. For any particulars in reference to the prize, address Drs. A. S. Talbott or S. Driggs, at Lexington, Kentucky, or Dr. Shadon, Box 2079, Cincinnati, Ohio, who will take pleasure in giving any information in their possession. W. H. S."

DENTAL REGISTER OF THE WEST—SEPTEMBER.

"THE DEMANDS OF THE AGE UPON OUR PROFESSION. By J. TAFT.—In all departments of human thought and effort, in this period of the world's history, a utilitarian spirit stands prominent. There is an almost universal disposition to make the most of everything, and turn everything to the best account. In a very special manner, is the practice of medicine, in all its departments, characterized by a utilitarian spirit. The practice of medicine, either as a whole or in any of its specialties, must result in good,—in the prevention of human suffering, and the production of happiness, otherwise it would be discarded. Our own specialty, dentistry, must needs partake of this same characteristic, in order to answer the general requirements of the age upon it; and he who practices his profession, with a determination to produce the largest results in doing good, most nearly answers the requirements of the age upon him.

"Other pursuits and avocations of life, far less intimately connected with the comfort and well-being of humanity, seem by their own spontaneity to be more and more flowing into utilitarian channels. This common current, then, indicates somewhat the requirements of the present period upon our profession.

"No one, then, who engages in a calling with which the comfort of his fellows is so intimately connected, should make the attainment of gain his highest object. The dentist who practices his profession with no higher aim than pecuniary emolument, should at once abandon it, and seek some other having less connection with human weal and woe.

"We do not say or believe, that any one should go forth to the performance of his work, wholly oblivious to the thought of remuneration, for this, in the nature of things, is made a stimulus to the well-doing of that which is performed; but the rendering of comfort and happiness to others should be the ruling thought, because it is a purer, more holy and happy-making one, and tends to elevate and make better, while the simple love of money tends to debase, and make one less good and happy.

"Again, he who would well accomplish that which he undertakes, should have a love for it. As a rule, no one ever does well that which he dislikes to do, at least it will not be as well done, as though there was joy in the doing.

"Again, this is an age of progress; it is a time when he who will not run must be left behind. In almost all departments progression is a watchword; no one can stand still, if he would, unless he shuts his eyes, and anchors himself down with hooks of steel to old ideas and practices.

"Occasionally, in our profession, we hear a man say, 'I see nothing new;' we have also heard a man say at mid-day, 'I do not see the light of the sun,' yet it did shine brightly nevertheless.

"Perhaps there are two reasons why men do not progress, why they see nothing new and interesting, why they do not see beautiful objects in the bright light about them; some are blind, their eyes covered with a film and scales, through which no light, however bright, can penetrate,—for such, an operation for cataract is required.

"Others, again, though they have some vision, see men as trees walking, and fail to apprehend, and apply that which they know exists; for such, the present rapidity of progress is too great: they have not been accustomed to move either mentally or physically, so that new things have passed so swiftly on, that they have caught only the shadow instead of the substance.

"Progress is the spirit of the age in all things, and unless we imbibe the spirit and act upon its teachings, we do not respond to the demands of the age upon us; 'old things are passing away, and all things are becoming new.' He, who will tarry in the old, must pass away with them."

DENTAL REGISTER OF THE WEST—OCTOBER.

"ALVEOLAR DENTAL PERIOSTITIS. *Read before the Iowa State Dental Society.* By HENRY S. CHASE, M.D. — The subject which has been assigned to me for an 'Essay' has, during my whole professional life, been the *opprobrium* of Dental Surgery.

"It has taxed the minds of our best men for the last quarter of a century. Patient experiment and unflagging research are at last beginning to remove the cloud; and we behold the dawn of better days.

"Inflammation of the alveolar dental membrane is of frequent occurrence; indeed, hardly a day passes that we are not called upon to treat it. The causes which produce it are various. The majority of cases result from death of the dental pulp. Many result from the constitutional effects of mercury; violent concussion of the teeth is another cause. It is frequently produced by suppressed perspiration, commonly called 'taking cold.' The disease is sometimes active, running to its termination in a very short time; at other times slow and insidious, taking weeks to produce pus formation. As a result of pulp-death, it is generally very rapid and severe. The symptoms are, in the incipient stage, a dull and slight soreness on occlusion of the jaws, gradually increasing to severe pain, throbbing in the offending part, and darting pains proceeding to the other teeth, and often to the eye and ear on the affected side. Severe symptoms, not accounted for by the non-professional, are often produced in other parts of the body, causing great anxiety to the patient and friends.

"Through reflex action, the pneumogastric nerve is affected, and severe cramps are felt in the stomach, sometimes with nausea and vomiting. Cholera is not unfrequently a result of this disease; also tonic spasm of the masseter muscle, and paralysis of an arm or leg. The salivary glands are generally stimulated to excessive action, and pour out great quantities of their peculiar secretion; and their inflammation is not an unfrequent result of their sympathy.

"If the disease runs its course unchecked by art, it usually results in abscess; though sometimes in resolution. The formation of pus is very unfortunate, as the symptoms are more severe, and, if unattended to, the results more grave.

"The presence of pus in the socket of the tooth is known by increased soreness on percussion, and protrusion of the organ from its socket, attended by swelling of the gums and adjoining tissues.

"Pus and an abscess are almost sure to be formed, if the disease is caused by death of the pulp, unless prevented by remedial means.

"As the upper bicuspid often penetrate the antrum, we frequently have inflammation of that cavity as a result of *simple* periostitis, but *more* frequently of the aggravated form caused by extravasation of pus into it. In about thirty-six hours after pus is formed in the socket, fluctuation will generally be observed in the tumor it has caused, indicating its presence which a sharp lancet will reveal. The pus usually makes its exit by absorption of the alveolus immediately opposite the end of the dentinal roots on the buccal surface of the jaws. Sometimes it takes place on the lingual side; at others it makes its way through the cancellated structure, and burrows for a long distance from the original seat of disease, spreading destruction in its track. At other times, though rarely, the absorbents attempt to carry away the offending matter, giving rise to frightful swelling of the whole face.

"*The treatment* of this dreaded disease must be on general principles. The remedies must vary according to the cause and stage of the disease. Many failures result from procrastination on the part of the patient. These cases are too often not presented to our notice until after pus formation, and then it is too often the case that the patient refuses any other treatment than extraction. The prognosis is favorable if under the following circumstances, viz.: simple periostitis; a good constitution; general good health; if caused by concussion; engorgement of capillaries from 'taking cold.' It is less favorable if caused by death of pulp, constitutional venereal taint, mercurial or strumous diathesis.

"In regard to teeth as *classes* subject to this disease, those more or less successfully treated are mentioned in their order: incisors, and cuspidati; bicuspid; upper molars; lower molars.

"I had almost forgotten to observe that dental decay, even without exposure and death of pulp, is a frequent cause of periostitis. Without exposure to the air the pulp sometimes becomes inflamed, and transmits its condition to the alveolar dental membrane. In this case, after application of creosote to the cavity of decay, if the inflammation should not be reduced in three days, I should destroy the 'pulp,' and remove it.

"I will illustrate my treatment by a few cases, occurring at intervals for the last twenty years. The treatment which in these cases was successful has, in other cases not detailed, sometimes been unsuccessful.

"*Case 1.*—July, 1843. Mr. H., bilious temperament, called and wished for relief. Has had pain and soreness in right lower molars and bicuspid several weeks. They are slightly loose, and the gums engorged with blood. Was mercurialized some years since. Health rather poor, liver inactive.

"Lanced the gums. To take one grain iodide potass., thrice daily. To have generous diet. Reported second week better. To continue medicine. Third week cured.

"*Case 2.*—March, 1845. Mr. F. sent for me: found the patient feverish, and suffering with great pain in lower incisors, which were slightly loose and sensitive to touch.

"Lanced the gums. To have hot foot bath. Take mercury, five grains to-night: in the morning dose sulph. magnesia. Called next day and found him better: the following day well.

Case 3.—May, 1845. Miss B. called to have right upper central incisor

extracted, being very painful. It had been filled one month previously, nerve not nearly exposed. A slight discoloration told me that the nerve was dead. With a very fine drill I pierced the gum just above its margin and entered the pulp cavity. On withdrawing the instrument it was followed by a rush of purulent matter. Immediate relief was experienced, and no after trouble known for many years.

"Case 4.—Mr. C. has had severe throbbing pain in left inferior molar, several days. Was filled six months ago; at which time pulp was destroyed; drill to pulp cavity and syringed with alcohol and creosote. Cured.

"Case 5.—Mr. G., aged 25. Called to have right upper molar extracted: he said it had ached three days and he could stand it no longer. Found the tooth perfectly sound, and also those adjoining. Refused to extract. Patient to take mercurius vivus; 3d dec. prep., once in two hours until better. Called in twenty-four hours and said the first three doses cured him. In this case the patient had a 'common cold,' and the lining membrane of the antrum was affected as was indicated by pain felt on pressure over this cavity. Doubtless the roots of the molar pierced this cavity, and thus participated in the inflammation. In this case a want of medical knowledge would have led me to have killed and removed the pulp. We cannot lay too much stress on the acquirement of a thorough knowledge of MEDICAL SCIENCE by those who seek to enter the Dental Profession. The want of it will surely degrade the science to a mere trade.

"Case 6.—July 5th. Mr. M., age 35. Applied to have the right upper lateral incisor extracted. Has a small plug in good condition on the lateral surface, which was placed there in 1857, over an exposed nerve. It was painful at times for about one year, and then 'ulcerated;' the discharge taking place on labial surfaces of gums, apparently about half way between the end of the root and alveolar border; has continued since that time troublesome, and lately so painful as to determine the patient on *extraction*. I declined to extract the tooth, and recommended an operation, which I immediately commenced. Beginning with a round burr drill, I hollowed out the posterior portion of the central part of the incisor near the cutting edge, and carried the groove upward until there was a shelf of bone sufficient to retain in place a drill No. 17 of the gauge plate. I now drilled straight into the pulp cavity, enlarging it, and going through the end of the root with a drill of No. 22 gauge plate. Syringed with alcohol, and wiped out with creosote, leaving considerable of the latter in the canal. Making a plug of soft rubber, I forced it tightly into the root as far as possible, and soon had the satisfaction of seeing the caustic effects of the creosote acting on the mucous membrane of the gum about the fistulous opening through which the purulent secretions had formerly discharged themselves. Dismissed the patient, who is to call again in a few days.

"July 10th. Patient called, and reports no pain; but has a feeling of uneasiness. Repeated the injection of creosote, but was unable to make it show its effects on the gum as before; conclude that the fistula has healed up. Wiped canal dry and plugged with soft rubber; dismissing patient for two days.

"July 12th. Tooth still remaining well, and uneasy feeling gone. I wiped with creosote and iodine, and plugged again with rubber, as I had no time to plug with metal to-day.

"July 15th. Plugged canal with tin foil, to remain one year unless there should be a return of disease.

"Aug. 6th. Tooth still continues perfectly well, and both myself and patient consider the cure complete.

"*Case 7.*—I report this case, because it was a very bad one, and had an unfortunate termination.

"Nov. 1863. Mr. F., age about 35, bilious temperament, called to have left under molar extracted; but very much wished it could be saved. Applied arsenical paste for twenty-four hours, and then removed pulp and treated with creosote one week; syringed tooth with alcohol and plugged with 'Wood's Alloy.'

"Jan. 1864. The tooth is sore and aches; drilled, but no exit of pus or other matter; forced a little creosote into the pulp cavity.

"Feb. Patient sent for me. Had been sick about a month under his family physician, to whom he had applied to have his tooth extracted the day after his last visit to my office; it being Sunday and my office closed was his excuse for not applying to me. Physician declined to extract. High fever followed, with sore throat; cramps in the stomach; swelling of the parotid and sublingual glands of the affected side; excessive flow of saliva, followed by rigidity of the masseter muscles. Nourishment and medicines were now taken through an opening caused by loss of a central incisor. Pus, mixed with large quantities of saliva, was daily evacuated. Owing to absence from town, I was not called sooner. I found the patient somewhat better of the symptoms before mentioned. The jaws could be slightly opened, and I extracted the tooth which had originated this trouble, as it was for this that I had been called, and not for a general treatment of the case. However, I ventured to recommend tinc. iodine as an application to socket of tooth, and an internal remedy of a similar character. The next week was sent for again to extract the second bicuspid, which was sore and loose, and from its margin of gum was weeping pus continually; found that my recommendation of remedies had not been followed in the least. Pus also continued to be evacuated from the socket of the molar before extracted. I had forgotten to say that the first and second molars of this side were missing.

"I again warned patient that medical treatment for this disease should be instituted.

"March 17th. Patient called at my office; general health much improved; but disease of the jaw still continued, and the first bicuspid was now involved in the matter, being sore, loose, and discharging pus around its alveolar border. Again insisted on medical treatment, to which patient acquiesced. Take iodide potassa first, dec. prep., thrice daily; nourishing diet of eggs, oysters, ale. After one week found the patient much improved every way; still there was swelling of the face and a purulent discharge; but the inflammation was not extending, and the first bicuspid was saved. I wished now to make an incision lengthways of the jaw, through the gums and periosteum as far as the disease had extended, for the purpose of evacuating any purulent matter that might be burrowing there; but patient refused. In a few days, his general health improving, he went to New York to purchase goods, and while there had professional advice, and a sequestra of bone removed from his jaw. Since his return some other small pieces have been removed, as I am told, for he has lost confidence in my skill, and imputes to me the

whole cause of his troubles. This is the most severe case I ever had, and was under my control very little.

"In the fifth edition of Dr. Harris' work, page 468, a much severer case is reported; the patient losing sixteen teeth in a few months.

"When alveolar abscess has formed, it should be opened at the most dependent portion, that the pus may all easily escape, and a little lint left in the cut to keep it open a day or two longer; otherwise the incision might heal by first intention, and the abscess fill again immediately.

"In the cases reported, we have seen that thorough cleansing of the root canals with alcohol, and injections of creosote and iodine, have been of great value in permanently curing chronic inflammation of the alveolar periosteum. The way to reach the seat of disease in different cases must be left to the judgment of the practitioner. The most difficult cases I conceive to be the molars. If we could be sure of finding the *ends* of those roots readily, through the gums and alveoli, doubtless it would be good practice to drill down to their end, inject with creosote and iodine.

"It sometimes happens that alveolar abscess evacuates itself into the antrum, causing inflammation of that cavity, with distressing and protracted symptoms—protracted, because it is so often mistaken for catarrh. In this case the antrum should be perforated between the roots of the second bicuspid and first molar teeth, unless an opportunity offers through the socket of a *worthless* tooth of this kind. The opening should be as large as a No. 12 drill. Syringing this cavity with a weak tincture of iodine and opium will be found beneficial, repeated once in two or three days until better. Mercury, as an *internal* remedy, will be indicated.

"I have thus, gentlemen, endeavored to give you *my experience* in the treatment of the disease under consideration, believing it unnecessary to detail the treatment recommended by authors, as the same sources of information are open to you as to myself."

INDEPENDENCE, IOWA, August 9, 1864.

"GOLD PALATE RUBBER WORK. By GAM'L JACKSON.—I believe that to Dr. E. Collins is due the credit of first using gold to cover the lingual surface of rubber plates. His method of attaching the plate, as described in the February number of the *Register*, 1862, consists in punching with a conical punch a row of holes in the plate around its entire circumference, and also around the air-chamber. It is easy to understand how the hardened rubber, occupying these holes, which are punched from the concave side of the plate, will hold it firmly in place.

"I have been making this class of work ever since I read Dr. Collins' description of it; and, rating it the best work yet made from rubber, I will describe my plan of making it, in which it will be seen that the means of attaching the gold plate differs essentially from that already given.

"I use gutta-percha for trial plates, softening in hot water, and rolling on a true surface. A cut from a smooth broom-handle may be used as a roller. Strips of annealed sheet brass, or wire passed through the rolling-mill until it is reduced to 23, English standard gauge plate, should be placed under the ends of the roller, so as to secure uniformity of thickness. In adapting the plate to the cast, the palatal part should be moulded first, or the plate is liable to be too thin in some places. The posterior edge of the plate should be trimmed to extend a little beyond

its finished limits. Having arranged the teeth on the plate as usual and returned it to the cast, the inside wax is trimmed to a level with the pins. The whole lingual surfaces of the plate and teeth being lightly oiled, a cast is taken, using the plaster thick enough to build up without setting over the teeth. The gold plate should be 18 carats, and rolled down to about 33. If the arch is high it will be easier struck if a piece is cut out opposite the centrals. Bevel the edges to be joined so as to give a good lap, using fine gold solder for this and other parts of the work. Trim the plate so that when the work is finished there will be a margin of rubber around it one-sixteenth inch wide. The edge of the plate may be finished perfectly square, except on the posterior part, which should be slightly beveled on the concave side. Nine or ten saucer-shaped buttons are next to be soldered to the plate, about a line from the edge, and it is ready to be adjusted for flasking. In adjusting, it will be necessary to warm the plate, so that the buttons will sink into the gutta-percha. Wax should now be carefully melted on the border outside the gold plate, sufficient for finishing. The buttons are punched from the trimmings of plate. The point of the punch used for this purpose is turned or filed to a broad-based truncated cone; and the hole in a small anvil will answer for a counter die. This hole may be 13 of the gauge plate. The buttons should be laid on the file-block and touched with a fine file, so that they will sit level on the plate. The quantity of solder to each button must be minute; and, after soldering, the borax will be removed by boiling in diluted sulphuric acid.

"If the rugæ are well defined in the mouth they will be so on the plate, and they, if the arch is high, will be sufficient to hold the plate in place while packing; but, if necessary, a short piece of wire may be soldered perpendicularly to the middle of the plate. It should be tapered and smooth, as it will be necessary to remove the plate, for the purpose of cleansing from gutta-percha and wax, for which purpose chloroform or ether may be used. The thickness of the gold plate and button together is 23 of the gauge plate, and the plate when ready for the mouth is 22. An ordinary plate will weigh about three pennyweights.

"The several advantages of this style of work are summed up by Dr. Collins, and have been fully realized in my experience with it."

BOSTON MEDICAL AND SURGICAL JOURNAL.

"TREATMENT OF NÆVI MATERNI BY THE SUBCUTANEOUS INJECTION OF SOLUTION OF PERCHLORIDE OF IRON —Mr. Robert B. Carter reports, in the *Medical Times and Gazette*, a second case of death following this operation, which has been communicated to him by Mr. Nathaniel Crisp, of Swallowfield. A *post-mortem* examination showed that the point of the syringe (the nævus being on the cheek) had penetrated the transverse facial vein, and that the blood in the right cavities of the heart had been immediately coagulated. Mr. Carter concludes with the remark, that he feels justified in saying that the subcutaneous injection of perchloride of iron should not be practiced, unless it is possible, by pressure with fingers or forceps, by acupressure or even the temporary application of ligatures, to close for a time the channels of the different veins; where this can be done, the remedy is free from danger, and will usually be effectual; but without such a precaution it entails so much risk to the patient that only the most exceptional circumstances would permit him to advise or employ it."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

On Teeth. By LIONEL S. BEALE, M.B., F.R.S., F.R.C.P.—“In investigating the changes taking place in the development of a tissue, great advantage will always be gained by studying the process as it occurs in the fully formed animal. It is a mistake to suppose that the process of development of tissue can be studied only in the embryo. Every stage of development of fibrous tissue, cartilage, bone, muscle, nerve, ganglion cells, fat cells, and many other tissues, may be seen in the fully formed frog, and the changes observed far more distinctly than in the embryo. In the adult newt the development of the teeth may be watched from the very earliest stages, and in the same animal may be demonstrated the changes which occur in the development of a complicated gland like the kidney, testicle, and ovary.

“The very youngest palatine teeth can be detached from the surface of the mucous membrane covering the palate of the newt, and it is to be noticed that in attempting to remove the epithelium from the surface of the mucous membrane, a number of entire tooth sacs, many of which contain each an embryonic tooth, are often detached with it.

“Now, each of these little ‘sacs’ is an oval mass, consisting entirely of cells very closely resembling epithelial cells in their general character. (Fig. 1.)* At this early period there is no actual *capsule*, or *external membrane*, but the most external cells are somewhat flattened and spread out, as shown in the figure.

“The stages which occur in the development of these teeth may be represented as follows. (Figs. 2, 3, 4, 5.) Fig. 2 represents a small collec-

Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Diagrams to show the manner in which the “papilla,” which takes part in the development of the tooth, is formed in the midst of epithelium, and how this “papilla” may be enclosed in a sac. It will be observed that the vessels do not come near to the tooth until its formation is considerably advanced. *a* is the layer of epithelium; *b*, a black line corresponding to the position of the basement membrane; *c*, vessel.

tion of cells embedded in the epithelium upon the free surface of the mucous membrane. As the sacs grow, they may become partially enclosed in follicles, by the growth of the mucous membrane around them, as shown in different stages in Figs. 3 and 4. A further stage of the process would bring about the very condition of things which occurs in the development of the mammalian tooth, the enclosure of the so-called papilla

in a sac. (Fig. 5.) The palatine teeth of the newt, however, are not enclosed in a sac at any period of their development.

"Now, it must be borne in mind, that at the time the so-called 'papilla' of the mammalian tooth is formed, there is no basement membrane, there is no sub-basement tissue, there is no indication of a line of demarcation between the texture, which will eventually be *epidermic*, and that which is *dermic*. There is a time when the cells, from which the epithelium of the epidermis is to be developed, cannot be distinguished from those which take part in the production of the areolar tissue, vessels, and nerves of the derma or true skin. It is certain that an elevation or 'papilla' occurs when a tooth is to be formed, but I think that in the *central part of these 'papillæ,'* which consist of collections of cells, *new ones appear*, and that this process continues, until at last the tooth structure *commences to be formed in the last collection of cells in the central part.* I consider that the dental 'papilla' is entirely composed of modified epithelium, developed from what might be termed an epithelial cell. The collection of cells afterward becomes enclosed in its sac by the growth of the mucous membrane over it, as represented in Fig. 5.

"So that at every stage of development, the cells which take part in the formation of the dentine are above the position of the basement membrane, while as the process is generally described, these cells must be, from the very first, beneath it. We have, according to the view generally entertained, first, the epithelium upon the summit of the papilla, then the basement membrane, and next the sub-basement tissue, in which it is supposed that the dentine is developed. According to this view, when the papilla is being enclosed in the sac, there would be *above the dentine three layers of basement membrane:* 1. That of the papilla. 2 and 3. The reduplicated mucous membrane which rises up around it, and ultimately incloses it. According to my view, there never can be more than the two last, as shown in Fig. 5.

"It seems to me, therefore, that both dentine and enamel must be looked upon as calcified epithelial structures, and I think they may be regarded as epithelial, in the same sense that a hair, or the cells in a glandular follicle, such as the sebaceous gland cells, or the sweat gland cells, or the calcified cells of the mantles of mollusca are regarded as modified epithelial structures.

"*The relation of the tooth sac to the proper dental tissues.*—If the foregoing conclusions are correct, the relation of the tooth sac to the dental tissues is easily understood. It has been shown that the enamel is covered superficially by a *vascular* membrane. This vascular membrane is the modified tooth sac. It has been shown that both the enamel and dentine are formed from epithelium, and it has been remarked that the cementum, or *crusta petrosa*, is sometimes developed upon the outer surface of the enamel, as well as upon the dentine of the fang of the tooth. In the complicated molars of the large herbivora, as is well known, this cementum is formed in considerable quantity upon the surface of the enamel, and in some teeth the amount of the cementum is equal to, or greater than, that of the dentine and enamel together.

"It is often said that the cementum is formed by the ossification of the tooth sac, just as bone is formed by the ossification of periosteum; but it has been shown that beneath periosteum a number of bodies resembling cells are produced, and that these are the agents directly concerned in the production of the osseous tissue. Although the fibrous tissue of the sac

of the tooth does not normally undergo ossification, there can be no doubt that this, like many other forms of fibrous tissue, may become ossified. Here, as in the periosteum, there are upon the deep surface cell-like bodies which are slowly produced, and from these the matrix is produced which afterward undergoes calcification. The germinal matter of some of these cells remains for a time as the 'nuclei' of the lacunæ which are sparingly scattered through the cementum. The very slow formation of their tissue, as compared with that of the enamel and dentine, is, doubtless, dependent upon the diminished proportion of nutrient matter distributed to the tissues as the tooth advances in development. In certain morbid conditions, a more rapid production of cementum is associated with increased vascularity of the so-called periosteum of the fang, which represents the remains of the lower part of the tooth sac.

"Although I have not succeeded in demonstrating the 'periosteum' of the tooth as a structure distinct from the 'periosteum' of the bony socket, as Mr. Spence Bate maintains, there can be no doubt whatever that, however closely these two structures may come into contact, continuous ossification never takes place. The cementum, however closely it resembles bone, never becomes structurally continuous with the bone of the socket, while the formation of cementum sometimes proceeds to such an extent abnormally as to connect two fangs, or even two teeth together. (See the figures of Mr. Martin's specimen, 'Tomes' 'Dental Surgery,' p. 445.)

"*Explanation of the different views now held upon the development of teeth.*—The different opinions now entertained by observers upon the development of the dental tissues and their relation to basement membrane, or to the position which such a tissue ought to occupy, are clearly shown in the following diagrams representing the tooth and its follicle.

"In each figure *a* points to the black line which marks the position of the basement membrane, *b* is the enamel, and *c* the dentine. The bony socket is represented by the structure shaded with crosses; above are the soft parts forming the lips of the follicle, the epithelium of the surface of the mucous membrane being only represented on the right side. The vessels in the substance of the pulp are also represented in each diagram.

"In Fig. 6 the black line is situated between the dentine and enamel. The enamel corresponds to the epithelium, the dentine to the connective tissue of a mucous membrane. This is the view entertained by most observers in the present day.

Fig. 6.

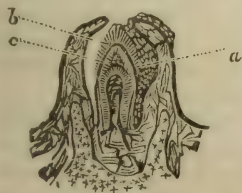


Fig. 7.

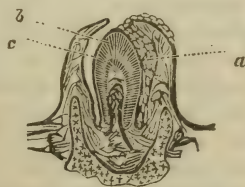


Fig. 8.

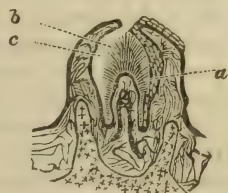


Fig. 6.—The basement membrane between the enamel and dentine. The view generally entertained.

Fig. 7.—The basement membrane covering the enamel. Dentine and enamel being both sub-basement. The view of Huxley.

Fig. 8.—The basement membrane beneath the dentine. The author's view.

"In Fig. 7 the black line corresponding to the basement membrane is seen to pass over the enamel, so that both the enamel and dentine lie

beneath this structure. They are both dermic structures. This is the doctrine of Huxley.

"In Fig. 8 the black line is seen passing over the surface of the pulp beneath the dentine, so that both enamel and dentine are regarded as modified epithelial structures. They are both epidermic. This is the view which I have been led to advocate from recent investigations.

"Of the death of the tooth, and of caries.—Teeth, like some other tissues, may die and be cast off. The circulation in the vessels of the pulp being interfered with, the entire pulp dies, the blood corpuscles become broken down, and the colored solution thus formed gradually stains the dentine. Still the tooth may be retained in its place for a long period of time, for although the pulp and surrounding dentine are dead, the cementum deriving its nutriment from the vessels distributed to the bone of the socket still retains its vitality, and oftentimes increases considerably in amount. If, however, the opposite process occurs and absorption takes place, the tooth soon falls out. Now, it would be said that when the vessels of the pulp are destroyed, and nutrient matter no longer permeates the tooth structure, that the entire tooth is dead; but it is doubtful if in such a case the enamel, the outer part of the dentine, and the inner part of the cementum, are more inanimate than when the tooth formed an integral part of the living body, and was supplied with nutriment from the same living blood as the soft parts. The tooth, although dead, remains firmly attached to the living parts, and continues to perform its important functions, like those hard organs which are connected with various parts of the surface of insects and crustacea. A dead tooth may remain for years, perhaps, firmly fixed in the socket; and it has recently been proved by the highly interesting researches of Dr. Mitscherlich that teeth which have been removed from the body, even for years, may be fixed in the alveolus of a living person and retained there for a long period. In this case the tooth is not renourished, but remains as lifeless as it was before. It appears that by the agency of some of the cells of the periodontal membrane remaining in the socket, little cavities formed upon the surface of the old cementum and dentine, and that afterward new cementum is produced as a counterpart, and thus the dead tooth is firmly held in its place. Dr. Mitscherlich's paper, which contains many things of physiological interest, has been translated and published in Truman's 'Archives of Dentistry,' No. 2.

"Of caries.—There are few subjects which have been more carefully studied than caries; but we have yet very much to learn with reference to the exact nature of this morbid process. That the dentine becomes very soft, owing to the removal of its calcareous matter, is a fact known to every one; but how this change occurs, and the precise circumstances which determine it, are still unknown to dentists and physiologists.

"Oftentimes low vegetable organisms may be detected in the carious matter, and by some, these have been supposed to be the cause of the disease; but fungi will invade any tissue which is in a softened state and not permeated by the normal fluids. Such fungi grow in vast numbers in all the old epithelial cells upon the surface of the mucous membrane of the mouth, and if the deeper cells suffer in nutrition, they often become invaded by such fungi; not only so, but the minute germs of such simple vegetable organisms exist even in the soft tissues in the interior of the body, and they germinate if the conditions become favorable—that is, if changes take place in the normal tissue whereby its integrity is destroyed,

or in consequence of which its death results. With reference to the nature of caries two views are entertained: one, that the change depends merely upon the action of the fluids of the mouth; the other, that some alteration in the nutrition of the tissues precedes the morbid change. Mr. Tomes has shown that the mucous membrane under irritation pours out a fluid capable of injuring susceptible teeth. That the fluid which acts possesses an acid reaction has been shown by experiment; but it is doubtful if, at least in the majority of cases in which the disease occurs, there is not a predisposition to it. The enamel and the dentine are the tissues usually affected, and the change goes on much more rapidly in the dentine than in the enamel. According to Mr. Tomes, the central portion of the enamel rods is that which is first attacked. In the case of the dentine, the intertubular substance is the first to go.

"Now, as I have already shown, this intertubular substance is formed before that portion of dentine which constitutes the 'wall' of the dentinal tube, and the oldest part of this intertubular substance is that which lies just beneath the enamel,—a part of the dentine in which caries very often commences. The dentine here is situated farthest from the nutrient vessels, and in cases in which any defect in formation had occurred, this would be the portion to undergo change. It is quite possible that in many instances the dentine in this situation may have been imperfectly formed during the early period of development, or the calcifying process may not have been properly carried out. These circumstances render the dentine very liable to disintegration if exposed to the action of acid fluids, or to saliva which was not perfectly normal. Perfectly sound tissue would resist the action of fluids which would certainly cause destruction of imperfectly developed dentine. The dentine is probably permeated very slowly by fluids which pass through the vascular walls from the alkaline blood. In the normal healthy state these alkaline fluids gradually pass from the pulp toward the outer part of the tooth; but if from any cause the currents flowing in this direction cease, the fluids of the mouth may attack the surface, and thus give rise to caries.

"Although in this way local actions may alone determine caries, it is probable that in almost all the cases in which it occurs, there is some defect in the formation of the dentine which renders it predisposed to decay; not only so, but caries is often associated with some temporary derangement of the health. That form of dyspepsia which comes on from mental anxiety seems, in some cases, to be intimately connected with the destruction of the dentine from caries. Nor are the dental the only tissues the nutrition of which is affected under these circumstances. Mental anxiety seems to be a cause of many chronic diseases. Some suppose that this arises from a peculiar and direct action of the nerves upon the process of nutrition; but it is much more probable that this influence is indirect, that the derangement of the digestive process and the action of the liver lead to changes in the composition of these nutrient fluids, and that in this way the results we have been considering are caused. Those tissues which exhibited any imperfections of structure or composition could be the least able to resist, from the deleterious influence which must arise from such changes in the composition of the fluids by which they were permeated."—(*Dub. Med. Press.*)

"*Neuralgia over the Spines of Certain Vertebrae.*—M. TROUSSEAU observes in *L'Union Medicale*, during a clinic on neuralgia, that when it

occupies the branches of the trifacial, it is always at the point of emergence of the ophthalmic branches of the superior maxillary and of the inferior maxillary that the pain is most acutely felt. Then comes the frontal point, where pain rarely fails; then the parietal point, where it is frequently wanting; last of all, the occipital nerve, although not related to the lingual in origin, is almost always affected. He has observed an inexplicable and invariable thing in all cases recorded, that whether the trifacial alone was attacked or the occipital simultaneously affected, pressure on the spinous apophyses of the first two cervical vertebræ was *always* very painful, and, in a certain number of cases, immediately awakened pain in the affected nerves. If the nerves of the brachial plexus were attacked, pressure over the spinous apophyses of the last cervical vertebræ produced pain; and it was the same when he explored the vertebral column in the case of intercostal, lumbar, and sciatic neuralgia. M. Trousseau lays it down as a rule, that in the various neuralgias the spinous apophyses are painful at a point nearly corresponding to that at which the nerve emerges, and not unfrequently the pain extends a little higher up the vertebral column."—(*Chicago Med. Journ.*)

"Acupuncture in Facial Neuralgia. By WILLIAM CRAIG, L.F.P.S.—I published a treatise in 1859 entitled, 'On the Influence of Variations of Electric Tension as the Remote Cause of Epidemic and other Diseases.' An effort is there made to establish the identity of nervous and electric fluid. The treatment I adopt in facial neuralgia forcibly illustrates the truth of this position.

"I have long believed that the essential cause of facial neuralgia is a superabundance of nervous fluid in the nerve affected, and that the proximate cause, in the great majority of cases, is a congestion of the nerve, bearing some analogy to capillary congestion in inflammation. I came to the conclusion that the treatment for the one form of disease should bear some analogy to that employed for the other; that as depletion is requisite in capillary congestion, so depletion ought to be beneficial in nervous congestion. I considered that, as nervous power and electricity are identical, when a conductor is presented or brought nearly into contact with a nerve, the overcharge ought to escape, and with it the pain, just as a charged Leyden-jar is discharged by a conductor brought near it. Full of this idea, when on my way to a case of facial neuralgia, about twelve years ago, I considered it a good opportunity to test my principles. The patient had been suffering from a severe throbbing pain shooting in the direction of the branches of the supra-orbital nerve. He had slept very little for some nights previously. I thereupon procured sewing needles, and inserted two or three of them near the place where the nerve issues above the eye. The pain went away immediately, and the patient was asleep shortly after. The pain has not since returned, (August 28, 1863.)

"Since the above period I have treated a very large number of cases of this affection by the same means, and with the same success. I have taken notes of a few of them only, as there is little variety in the character or development of this affection, and none in the treatment.

"*Case 1, May 6, 1852.*—J. R., aged 42, states that he has been subject to attacks of severe pain over and under the right eye for several years. The attacks generally continued for a month or six weeks in

spring. He has now been ill for eight days, during which the pain has continued with very little intermission, and he has obtained scarcely any sleep. I applied the conductors above and below the eye, and the relief was immediate. He fell asleep in ten minutes afterward. He told me he could not express the agony experienced at the onset of a paroxysm. In June, 1860, the pain had not returned.

"Case 2, September 4, 1856.—Miss A. has been for four years subject to attacks of neuralgia during each winter. Each attack continued about six weeks. She now complains of a severe pain of a burning and shooting character over the right eye and right cheek. 'She has been obliged to go up and down stairs all night, unable to find a resting-place.' She has had various internal remedies without effect. The conductors were inserted, and the pain left immediately. June, 1864.—It has not returned up to the present time.

"Case 3, June 28, 1857.—Miss McJ. complains of a severe darting pain on the right side of the back of the neck and head. She has been suffering from it for a fortnight. The pain extends from a point two inches behind the ear to the crown of the head, at the situation whence issues the occipitalis major nerve. She has had no sleep for some nights. The conductors were inserted, and the pain went off immediately. June, 1864.—Miss McJ. states that she has not been troubled with pain since.

"Case 4, March 12, 1858.—W. H. has during each winter for the last ten years been affected with neuralgia of the left side of the face of such severity as to prevent him from working. He has tried very many medicines, and has had the nerves above and below the eye divided, the cicatrices being quite distinct. He has found no benefit from these means. When first seen his head was enveloped in several layers of flannel, and he was surrounded with awnings to prevent the slightest current of cold air from reaching him, as this immediately induced an intense paroxysm. It was with great difficulty that the treatment could be adopted, on account of the extreme sensitiveness of the skin of the face, but as soon as the needles were applied he was partially relieved. March 13.—He is considerably better, but very weak. He gradually got stronger, and was soon at his work again. May 23, 1860.—He has remained quite well for the last two years, and has been exposed to all kinds of weather.

"It must be admitted that every case of facial neuralgia which I have met has not been cured by this means. But this admits of easy explanation; for in diseases of the nerves, as in those of other structures of the animal economy, there is sometimes inflammatory action and change of structure, producing neuralgic pain, in which case little benefit can be expected from acupuncture. In a case in which the mental nerve had been the seat of neuralgia, which had continued for ten years, the treatment by conduction was nearly fruitless. For twelve hours after the first insertion of the needles, the pain had completely gone, but afterward it returned as before. In Case 4, however, which was very much of this character, the cure was complete. Cases which have little or no intermission, and which have existed for years, seem to be amenable to no form of treatment; at the end of so long a time there may be a change of nervous structure. It is necessary to allow the needles to remain applied for ten or twelve hours. In a case from the country about a month ago, the patient required to leave town in three hours; in two days the pain returned, but on the reinsertion of the conductors it was removed. After twelve hours he left, and did not return. It seems to be necessary not

only to draw off the quantity of nervous fluid which produces the paroxysm, but also to take off for a time its normal supply, in order to break off the tendency to a return of the paroxysm. That this is the case may be concluded from the fact that sometimes the textures for a small space around the situation occupied by the conductors are benumbed, as if the cutaneous nerves had been for some time deprived of their proper supply of nervous fluid. It has been found that electricity passes from the free ends of the needles during acupuncture. Dr. Dantu states that a patient, immediately on the insertion of a needle, felt a gentle electric spark affect the tissues in the vicinity of the needles. M. Schwerger has observed the same phenomenon attend his operation as electricity was made appreciable by the deflection of the electric multiplicator. These electric phenomena, though not sought after to support preconceived opinions, but related as mere matters of fact, are exactly what might be expected from the principles here advocated. According to this fact—viz., that electricity escapes from the needle in acupuncture, thereby relieving the nervous congestion which causes tic—the induction of an electric current into a nerve subject to neuralgia would be followed by an aggravation of the pain. This happened in cases reported by Dr. Althaus, (*Medical Times and Gazette*, August, 1858.) He states that Duchenne recommended to cause a strong revulsion by producing Faradisation with the metallic brushes, conveying a very powerful electro-magnetic current through the part affected. But the pain by this proceeding was, according to Duchenne himself, 'so atrocious,' that after applying it to several cases he was obliged to desist. This result of the experiments of Duchenne is exactly what might have been expected from the principle here advocated. The atrocious pain was just the consequence of sending into the already congested nerve a stream of the same element, an over-supply of which was agonizing the patient. Electricity in the form of current has been frequently applied in neuralgic affections, but, so far as I know, with no favorable result. These French observers state that the electric phenomenon immediately consequent on the insertion of the needles is the result of the oxidation of the metal; but the effect is so instantaneous, the relief so speedy, that oxidation could not have begun before the cure was completed: the result is too great and too speedily effected to be accomplished by such a trifling amount of action, or, more correctly, no action at all.

"For a considerable time after their insertion there is no impression of oxidation on that portion of the needle which is imbedded in the tissues, and long before that time the patient is cured.

"It is no exaggeration that by this treatment the cure is immediate, as any one may satisfy himself by inserting a conductor of proper size in the proper place during a paroxysm in a pure case of facial neuralgia."—(*Med. Times and Gazette*.)

"*Acupuncture in Facial Neuralgia.* By ROBERT B. ERSKINE, M.D., and L.R.C.S.E.—In the number of the *Medical Times and Gazette* for September 10, there appears an interesting communication by Mr. Craig, Ayr, on the subject of the treatment of facial neuralgia by acupuncture. Having myself witnessed the good effects produced by this remedial agent in two cases of the above painful affection, I hasten to lay the facts before your readers.

"*Case 1.*—Miss M. F., a middle-aged woman, of a spare habit and well-

marked nervous diathesis, has suffered since the beginning of January of this year from frequent attacks of facial neuralgia. The pain which she endured was intense, and was referred to the right side of the brow. It was of a shooting, lancinating character, and frequently recurred for several nights in succession, effectually banishing all sleep till the morning. Iron, quinine, and other remedies had been administered, but with no beneficial results. Having seen Mr. Craig's work on 'The Influence of Variations of Electric Tension as the Remote Cause of Epidemic and other Diseases,' in chap. 14 of which he adduces several cases of facial neuralgia where acupuncture had been employed by him, and had proved most successful, I suggested to him that this appeared to be a suitable case for the adoption of his mode of cure. Accordingly, on the evening of June 25, as soon as the pain was experienced, three needles were inserted in the region of the supra-orbital nerve. In less than ten minutes the patient expressed herself better, and stated that the pain was entirely gone. The needles were, however, allowed to remain in till the morning. Since the above date she has not, up to the present time, had another attack of the disease.

"Case 2.—Mrs. A., aged thirty-eight, of a delicate, anæmic appearance, had suffered during a period of six weeks from several attacks of neuralgia in the region of the left infra-orbital nerve. The pain was of a lancinating character, and extended over the cheek and lower eyelid of the affected side. After trying various remedies, but to no purpose, I inserted two needles, and allowed them to remain *in situ* for a couple of hours. At the expiration of that time, when I returned to withdraw them, I was informed that the pain had entirely ceased. A month afterward I chanced to see her, and she stated that she had not experienced a recurrence of the disease since the introduction of the needles.

"Mr. Craig, in his treatise to which I have before referred, gives the *rationale* of this plan of treatment, also illustrations of the method of applying the needles, and moreover claims for himself the merit of having been the first to employ acupuncture in this particular and oftentimes most obstinate form of neuralgia."—(*Ibid.*)

Chloroform Poisoning.—"DR. MACKER related the following case to the Medical Society of the Haut-Rhin: A soldier, aged 27, on furlough, and in a state of drunkenness for several days past, seeing a bottle on a table, which he thought contained alcohol, drank off its contents, which consisted, in fact, of $12\frac{1}{2}$ drachms of chloroform. He was found soon after vomiting, and soon became insensible, still continuing to discharge mucosities. The pupils were enormously dilated, and his aspect was cadaveric; the respiration was stertorous, the pulse one hundred, and feeble, and the action of the heart occasionally tumultuous. There were present utter loss of consciousness, complete relaxation of the limbs, and absolute general anæsthesia. After a short period the pulse became insensible, the respiration was arrested every now and then, and there was trachial *râle*. Stimuli to the surface and artificial respiration were resorted to, and strong coffee infusion was injected. This alarming condition continued three hours, the anæsthesia remaining complete and the pupils dilated, while occasional contraction of the limbs was observed. An hour later, however, the pulse rallied, and the skin became warmer, but anæsthesia still persisted. At the end of the sixth hour the amelioration was very manifest, and in another hour he was carried to the hospital. He retained no

memory of what had passed, and neither convulsions nor delirium ensued; and next day he complained of little but what might be due to his excess in drinking.”—(*Union Méd.* and *Med. Times and Gaz.*)

Cancrum Oris.—At a late meeting of the Cincinnati Acad. of Med. DR. GOODE “reported the case of a little girl eight years old, who had been under the treatment of Dr. Fishburn up to two weeks previous, she being then convalescing from typhoid fever. Dr. Fishburn being ill, Dr. Goode was called, and found a black gangrenous mass, two inches in diameter, in the right cheek. On opening the mouth, the same condition was found on the inside of the cheek, and every tooth in the upper jaw had dropped out but one, which was easily removed by the fingers. The gums and soft palate had sloughed; the tongue looked well and clean, better than could be expected in a case of this kind. The gums and teeth of the lower jaw were sound. This trouble did not result from pytalism, as no mercurials had been given; but it was constitutional, independent of any remedies administered. Dr. G. said he considered the case hopeless, but gave tincture of iron, beef essence, and brandy; he applied warm flaxseed poultices over the surface of the cheek and touched the gums and inner surface with a solution of nitrate of silver. The child lived ten days, (at which time the difficulty involved the whole face, extending even below the lower jaw,) at last dying, not from the disease, which was cancrum oris, but from hæmorrhage, which came from the mouth. The child lived in the first story of a frame house built on a side hill, the back rooms of the house resting against the bluff bank, and being nothing more than damp, dark cellars.

“Dr. Carroll said he had this year one fatal case of cancrum oris, following measles.

“Dr. Muscroft reported he had but two cases in his practice of cancrum oris, both fatal; one following typhoid fever, the other independent of any disease, appearing first by an ash-colored spot on the angle of the jaw, at the root of the teeth.

“Dr. Carroll thought it a curious disease. When, a number of years ago, he was physician of the Cincinnati Orphan Asylum, there were twenty-eight inmates of the house, of which number fourteen died in one year of cancrum oris. That it depends on confinement and the state of the atmosphere. All the cases he had published followed measles.

“Dr. Muscroft once saw on the upper lip of a child an ash-colored spot, much swollen and glazed. He thought it a case of cancrum oris, and that the child would die. He used locally tinct. iron, and internally the same remedy and iodide of potash. The child recovered under this treatment.

“Dr. Tate had seen cases of cancrum oris following measles, which had recovered. Also referred to a specimen of maxillary bone, which he had already presented to the Society, which came from a child after measles. In this case, the child lived in a healthy locality, took the measles like other children, but, after recovering from them, the fetid condition of the breath was noticed, and on examination it was found that the destructive process of the gums had commenced. He applied the stick of the nitrate of silver, and gave Huxham’s tincture internally, a very valuable remedy, he thought, in all such cases. Dr. T. also said he had seen two such cases of cancrum oris, independent of deterioration of the blood, from eruptive disease; but they were in an unhealthy atmosphere, occurring several

years ago, in two old houses on Race Street, near the river, where, from the situation, the cellars were always damp. Also another fatal case, within the last three years, which he had treated with iron. He thought the disease lasted two or three weeks, and that it was surprising how long children affected with it would live.

"Dr. Carroll remarked, that ten years ago or more his grandchild, a delicate girl, became affected with purpura. Ecchymoses appeared along the sides of the feet, one eye soon closed, then the other was affected similarly. She was blind for three days; then the first eye opened, and soon the other. By this time the inferior extremities were much swollen, likewise the abdomen, by an effusion of at least six quarts of fluid between the layers of the peritoneum. The doctor gave squills, digitalis, and calomel for a slight purgative effect; at the same time constantly administering iodide of potash. After all her friends had given her up, she passed a gallon of water in one night, and then recovered. Now ecchymosed spots appeared on the gums around the base of the teeth; and wherever these spots appeared, the disease dipped down to the alveolar process, removing the periosteum. The first set of teeth were thus destroyed, but a new set appeared, and the child is now a stout, healthy girl. At the latter stage of the disease mild tonics, quinine, and wine were given; but the doctor's main reliance was in iodide of potash, till the free discharge of urine, referred to above, took place. At the height of the disease she passed small quantities of urine, which contained albumen. Dr. Carroll could not account satisfactorily for the disease, but thought she had been constipated for some time, and had voided but little urine till the ecchymoses came on. He was also inclined to believe that the profession did not give iodide of potash as freely as they ought in dropsy.

"Dr. Muscroft asked Dr. C. if it was not a case of scorbutus, saying he had seen cases like the one described, in which the gums were spongy and would bleed; ecchymoses and purple spots were apparent, and the teeth lost; and he had never seen the same condition in any other disease than scurvy."—(*Cincinnati Lancet and Observer.*)

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 "*Phenic Acid in the Treatment of the Bites of Venomous Reptiles and Insects, and of Dissection Wounds.*—DR. JULIUS LEMAIRE highly extols the efficacy of cauterization with phenic acid in the treatment of all poisoned wounds. He states also that moist gangrene may be arrested by the same application. Mr. L. claims that in all these cases cauterization by phenic acid is more effectual than by the actual cautery, or by any other caustic. Two or three drops of the acid applied to a puncture are sufficient to arrest the dangerous effects of the poison. In cases of bites or wounds the acid should be applied to the whole of the wounded surface."—(*Le Moniteur Scientifique and Cincinnati Lancet and Observer.*)

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 "*Petrifaction of Animal Substances.*—About twenty-five years ago the scientific world was surprised by an announcement of the fact that a Venetian, named Girolama Segato, had discovered a means of reducing dead bodies to a state of hardness closely approaching to that of stone, except at the joints, where he had succeeded in maintaining a certain degree of pliancy. The results obtained by Mr. Segato in this direction were altogether wonderful, and many strangers used to visit his collection

at Florence, where he had settled. Nevertheless he was not encouraged, first, on account of his political principles, and, secondly, because the clerical party, which was then all-powerful, got up a cry of impiety against him. His secret found no purchasers, and he died in consequence of a complaint which he had contracted in visiting some of the wildest parts of Africa. A short time after his death, the late Abbé Francesco Baldacconi, director of the Museum of Natural History at Sienna, obtained certain results which led to very strong hopes that Segato's secret might be rediscovered. Mr. Baldacconi's process consisted in steeping the anatomical specimen for several weeks in a solution of equal parts of corrosive sublimate and salammoniac, a mixture which, by the earlier chemists, was called *sal alembroth*; and in 1844 a liver thus prepared was sent over by him to the Academy of Sciences here. This specimen had acquired the consistency of steatite, or of serpentine, and was perfectly incorruptible. The Italian papers now state that a Sardinian naturalist, Professor Marini, has rediscovered Segato's secret. His process is also kept a secret, but from the description it appears that he obtains still more remarkable results than his predecessor. He has constructed a small table entirely composed of petrified animal substances, viz: brain, blood, and gall, and having quite the appearance and consistency of breccia. His preparations are incorruptible, they preserve their natural color, and will resume their original state on being immersed in water for some time. Professor Marini intends to exhibit his preparations in Paris."—(*Les Mondes* and *Amer. Journ. of Sci. and Arts.*)

"The Metals of the Future.—Until the year 1807 no one had suspected that either the alkalies or the earths were other than 'simple' or 'elementary,' and decomposable substances; but in that year Sir Humphrey Davy took the first step into a new world, teeming with materials for new arts, by the discovery of the true constitution of soda and potash. Having found that those alkalies are really oxides of metallic bases, compounds of oxygen with the metals sodium and potassium, he was led to conceive that the earths, lime, magnesia, baryta, strontia, and alumina, and also silica, which he classed with the earths, were probably similarly constituted. He soon established that they are so. In the following year, 1808, he succeeded in eliminating from lime, magnesia, baryta, and strontia, their metallic bases calcium, magnesium, barium, and strontium; and although he was not quite so successful as regards alumina and silica, he yet demonstrated conclusively that they also are oxides.

"Of the oxides above enumerated, four—namely, lime, alumina, magnesia, and silica—make up at least four-fifths (probably more) of the earth's crust. Sir Humphrey Davy regarded the base of silica as metallic, and accordingly named it silicium; but modern chemists consider it as resembling carbon and boron rather than the metals, and therefore prefer to call it silicon. The bases of lime, alumina, and magnesia, however, are undoubtedly metallic, and it is to their bases, the metals calcium, aluminium, and magnesium, that we venture to apply the designation, 'The Metals of the Future.' Each of these metals exists in immensely greater abundance than either gold, silver, copper, iron, lead, tin, or zinc, or indeed than all the familiarly known metals put together; and as it seems to be a law of the universe that, in proportion to the abundance in which things exist, so have they great and important uses in every form in which they are capable of remaining permanently, we cannot doubt

that the extraction of these metals, and their preparation for purposes of manufacture, are destined yet to become, and perhaps before very long, among the most widely practiced of metallurgical processes.

"The first of these metals to be brought into commerce was aluminium. Proved to exist by Davy in 1808, but first actually obtained by Wohler in 1827, down to 1851, aluminium had been obtained only in exceedingly minute quantity, and only in the form of a 'gray powder.' The first compact piece, weighing more than a few grains, ever produced, was exhibited in the French department of the Hyde Park International Exhibition. By 1854, Sainte-claire Deville had shown how it could be produced in almost any quantity, and soon the production of aluminium, which had hitherto been confined to the laboratories of the most expert of the brotherhood of chemists, began to take rank among the industrial arts. At the end of 1854, the selling price of aluminium was still at the rate of £55 per pound; but in 1858 the price was reduced to £5 per pound. In 1860 the manufacture of this metal, under Deville's patents, was undertaken in this country by Messrs. Bell Bros., of Newcastle-on-Tyne, who now produce it in considerable quantity, and are at present selling it at about £3 per pound. As yet, it has been applied to scarcely any but ornamental purposes, and to these chiefly in its alloys with copper, known as 'Aluminium Bronze.'

"Of these alloys of aluminium and copper, there are three in use, containing, respectively, 5, 7-5, and 10 per cent. of aluminium, and selling at 4-6, 5-6, and 6-6 per pound. These alloys are 'so like gold as scarcely to be distinguishable therefrom, with the additional valuable property of being as hard as iron,' and they are being very largely used, instead of gold, for watch-chains, watch-cases, pencil-cases, and trinkets generally, and also for articles of ornament for the table. Aluminium, by itself, has as yet been used only in the construction of mathematical instruments, and as material for the delicate weights of chemists' balances, and also for statuettes and other small works of art produced by casting. Except for its dull color and inferior lustre—which, however, are probably due in part to impurities contained in the metal as at present produced, so that we may expect that a metal much richer in color and lustre will be obtained when the metallurgy of aluminium shall have arrived at greater perfection—aluminium would be especially suited for applications of the latter kind, since 'it requires a much less intense heat than silver for melting, and when melted solidifies much more slowly, and is therefore particularly well adapted for castings that require to be executed with great delicacy.

"Considering how short a time has elapsed since the art of eliminating aluminium from its compounds had its birth, the present selling price of the metal is marvelously low; but at the same time it no doubt greatly restricts the use of the metal. While its present price continues, aluminium will probably be confined to such applications as those mentioned above; but at the reduced cost, which is sure to be the result of improved processes of production, the area of its applications will doubtless be very widely extended. Its lightness, (its specific gravity being only 2.56, or about one-fourth of that of silver and about one-third of that of iron;) its greater freedom, as compared with the commoner metals, from liability to discolor or oxidize by exposure to the atmosphere; its sonorousness 'greatly exceeding that of silver as regards clearness;' its non-liability to be acted upon by any of the elements of ordinary foods, and the non-

poisonous nature of salts—negative qualities eminently fitting it for use as a material for vessels and utensils to be used for culinary purposes; and, finally, the great tenacity* and malleability of many of its alloys and the exceeding hardness of others,—these are properties which are certain to secure for aluminium, whenever its price shall permit, applications quite as numerous and as extensive as those of any metal at present in ordinary use.

“Another of these metals, magnesium, the base of the earth magnesia, is now being ‘brought from the laboratory into the workshop of the artisan.’ Three years ago all the chemists who had ever obtained magnesium at all, had probably not obtained an ounce among them, and only one year ago the selling price of the metal was still at the rate of 112 guineas per pound. Prof. Roscoe, however, on Friday week, exhibited some pounds of magnesium (of very much purer quality than had ever been seen while the metal was produced only by the grain) which he had himself seen produced the day but one before, during a half hour’s visit to the magnesium works which Mr. Sonstadt has recently established at Salford; and one of the five cardinal facts in the history of magnesium, which, the better to impress them on the minds of his audience, he had caused to be stated on a painted placard hung above the platform, is that Mr. Sonstadt is now selling magnesium wire at three pence a foot.

“Magnesium is a lighter metal than aluminium, its specific gravity being about 1.74. It is thus rather more than six times—whereas aluminium is only four times—lighter than silver. Its color and lustre are to those of aluminium as those of silver to those of zinc; indeed, if either of the two metals, magnesium and silver, has any superiority over the other as regards beauty and richness of color and appearance, the advantage is probably on the side of magnesium. In one important particular, magnesium has certainly the advantage of silver; while it does not oxidize, in a moderately dry atmosphere, any more readily than silver does, it is entirely unaffected by sulphuretted hydrogen, by which silver is so speedily tarnished.

“Though magnesium does not exist quite so abundantly, perhaps, as either calcium or aluminium, there is very much more of it in the world than of any of the commonly used metals, not even excepting iron. Besides entering into the composition of an immense number and variety of less abundant minerals, it constitutes 13 or 14 per cent. of dolomite, or magnesian limestone, a rock which is found in almost all parts of the world in enormous quantity. In England, for example, ‘the magnesian limestone formation extends from Tynemouth to Nottingham, a distance of 147 miles,’ and over, at least, part of that long line is 600 feet thick. Magnesian limestone consists partly of carbonate of † magnesium and partly of carbonate of ‡ calcium; but carbonate of § magnesium, by itself, exists in immense masses in some parts of the world, as, for instance, in Greece and in India. In the ocean, moreover, magnesium exists in such quantity that, where salt is obtained by evaporating down sea-water, the ‘mother liquors,’ left after the separation of the salt, might be used as perhaps the most economical ore of magnesium. Mr. Sonstadt has calculated that

* The tenacity of a wire of aluminium bronze containing 10 per cent. of aluminium is greater than that of a wire of the best iron, of the same thickness, in the proportion of 155 to 100.

† The protoxide of.

‡ Ibid.

§ Ibid.

the ocean contains *one hundred and sixty thousand cubic miles* of magnesium—a quantity which would form a cubical mountain measuring fifty-four miles every way, and would cover the entire surface of the globe, both sea and land, to a thickness of more than eight feet.

“What are the uses of the metal of which the world thus contains such a marvelous store, and the obtainment of which in any quantity—in such quantity, for example, as that in which we obtain iron—is now, thanks to the genius of Mr. Sonstadt, simply a question of working on a sufficiently large scale? Considering that it is little more than a year since the metal was first produced by the ounce, it is not wonderful that we can as yet answer this question only imperfectly—that, with respect to the properties of the new metal, very little is at present known. No metal, except gold, is better adapted for purposes of ornament; it is believed to be specially suited for telegraphic purposes; and, struck by the fact that it is but little heavier than heart-of-oak, while, in certain conditions as to purity, etc., it is believed to be as strong and tenacious as steel, some one has suggested that, when it shall be cheap enough, we shall build our ships of war of it; but the only application of it which has, as yet, actually been made, is one dependent on the extreme richness in actinic rays of the light given forth by the flame with which it burns in atmospheric air.

“The light is richer in actinic power than any other artificial light known—is so rich, indeed, in chemical rays, that the sun itself, when unobscured by a fog or cloud, exceeds only by thirty four times the chemical power of a magnesium flame having the same apparent diameter as that which the sun presents. The result is that, by the light produced by the combustion of magnesian wire, such as is now being sold at three pence a foot, we are able to maintain, in any weather and at any hour of the day or night, much better photographs than can ever be obtained in this country by sunlight, except on such clear and sunny days as occur in this climate but very rarely indeed. Magnesium will thus render us henceforth independent of the sun for photographic purposes, and will, moreover, enable us to obtain photographic pictures of places—such as the interior of caves and mines, the passages in the interior of the Egyptian pyramids, and the like—into which sunlight never enters, nor can enter.

“But it is not in actinic power alone that the magnesium light exceeds all other artificial lights yet produced. For the purposes of artificial illumination generally it is without a rival. A very thin magnesium wire will give off in burning as much light as a very powerful electric lamp; but the magnesium light, unlike the electric light, is soft and diffusive, and does not in the least dazzle or pain the eyes. It is, moreover, of the purest white, so that all colors, even to the most delicate tints, are seen in it as perfectly as in sunlight, while a magnesium lamp has over both the electric lamp and the ordinary gas-light the advantage that it can be carried about as readily as a candle. A still greater advantage—one, indeed, of immense importance—which the magnesium light has alike over gas and over any kind either of oil-lamps or of candles, consists in the circumstance that magnesium, in undergoing combustion, gives off no deleterious vapors, nor indeed any vapors of any kind. Instead of its burning as gas, candles, and oil do, into aqueous vapor and carbonic acid, with a greater or less admixture of sulphuretted hydrogen, and other furniture-destroying, plate-tarnishing, and health-injuring compounds, the only product of the combustion of magnesium

is a harmless *solid*, the oxide of magnesium or magnesia. All this points to the magnesium light being likely to come extensively into domestic use, while its great brilliancy would seem to render it eminently adapted for use in light-houses. In all probability its price will not long be an obstacle to either of these two applications of it; for even now, while the manufacture of magnesium is not yet three months old, the light from magnesium is but little more costly, quantity for quantity, than that from 'composite' candles, seeing that two and a half ounces of magnesium will give forth, during combustion, as much light as *twenty pounds* of the best stearin.

"Such is a rapid outline of what has, as yet, been done toward bringing into common use two of the three most abundant metals in nature—metals which will probably one day exceed all others in the variety and importance of their applications. With calcium, the other of the three metals in question, we are almost unacquainted in the metallic form. Combined with oxygen and carbon, it exists in nature certainly in greater quantity than magnesium, and probably in greater quantity than aluminium; but it has never yet been eliminated by more than a few grains at a time. The largest pieces of it ever seen are some recently obtained by Mr. Sonstadt, none of them weighing more than 20 grains, and it has probably never been seen pure at all. Much the same might be said of both barium and strontium, which two metals, although they cannot be compared for abundance with either calcium, aluminium, or magnesium, yet exist in quite as great quantity as some of the metals now in common use, and in quite quantity enough to permit of their being of much importance in the arts in future.

"The extraction of these 'metals of the earth,' from the compounds of them with oxygen and other bodies which exist everywhere in such vast profusion, is the object of a new branch of the art of metallurgy, which may be said to have had its origin entirely within the last decade, and which promises to rapidly attain immense proportions. Of the principles and processes which distinguish this new branch (which has very little in common with the other branches) of the metallurgic art, and of what has yet to be done in order still further to cheapen the metals to which it is applied, we may probably speak in another article."—(*London Mechanics' Magazine and Med. and Surg. Reporter.*)

New Solder for Silver and other Metals. "By L. S. NAUDIN, Rouen. —For the purpose of soldering or uniting together silver or other metals, the inventor prefers in most cases to employ the following metallic substances in varied proportions, that is to say: He takes of brass, six hundred parts; of tin, one hundred parts; of bismuth, two hundred and eighty parts; and of German silver, twenty parts. He then fuses or smelts those metals in succession in one or more crucibles suitable for the purpose, commencing first with the least fusible of them, and so soon as the whole of the metals are properly smelted or reduced, he mixes or incorporates them well together, and then pours or casts the said mixture of metals either into an ingot mould, or into a vessel filled with water, so as to produce the improved solder either in ingots or in a granulated form."—(*Amer. Artisan.*)

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, JANUARY, 1865.

No. 6.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Caries of the Teeth.—This is a subject which has given rise to a vast amount of discussion and difference of opinion. No correct nomenclature can be claimed for it until we know exactly what it is. We will use the word *caries* as designating the change the tooth undergoes, from a sound to an unsound state. It is true that men cannot agree about the nature of decay until they agree about the nature proper of the tissue involved. It is held by some that the dentine and enamel of a tooth are not under the control of the vital forces when they are once formed; and by others, that the whole tooth is forever under the control of the vital forces as long as it is in the jaws. This latter view we propose to hold to at present, if it means that the teeth are constantly undergoing a vital change, like other tissues of the body, proportionately to the circulation they are endowed with. We cannot embrace the doctrine that a tooth is devoid of nutrition, and consequently not undergoing a change of particles, for better or worse, according to the kind of diet of the individual, change of locality, health, etc. Some claim that it is chemico-vital; others, that it is purely chemical; and others, that it is purely vital, and, owing to the latter view, the word *caries* was adopted. Now, we do not hold that it is necessary to adopt either view for purposes of practical investigation. There can be no doubt that acidity of the fluids of the buccal cavity is the direct cause of dental caries; but the source of this may be more difficult to determine. We know of no case of caries having taken place in a tooth without an external opening admitting the fluids of the mouth and air. Acids will act on the tooth out of the mouth, and produce the same appearance as that which we call decay, when it occurs in the mouth. Fifteen years ago we made many experiments with different acids, fruits, and confectioneries, all which acted

on the enamel, and produced the same appearance and destruction of the enamel that we daily see in the mouth, which is known as white decay. We believe that caries is chemical, modified by the vital condition of the tooth at the time. We know it to be a fact that the dentine of the teeth is more highly sensitive while the teeth of a patient are undergoing rapid and white decay, than at other times in the life of the same patient.

During the time of making the series of experiments referred to, we made a section of dentine after it had been deprived of its earthy constituents. The appearance is illustrated in Fig. 1.* To obtain this section, we proceeded in the following manner: After saturating the dentine in dilute hydrochloric acid, we let it dry until it became like soft horn, so that it could be cut with a razor. We placed a portion of this semi-solid dentine in a small hand-vice, first having polished the outer surfaces of the jaws, so as to obtain a smooth surface, letting the dentine project a little above the surface of the jaws; we sliced it off with the razor, then, turning the thumb-screw of the vice a very little, it caused the dentine to protrude sufficiently to obtain an exceedingly thin slice or section. This thin slice curled up like a shaving from a carpenter's plane. We threw this into common water, when it immediately floated out on the water and assumed its natural size, and looked like a thin flake of ice. This we removed from the water, and placed it between plates of glass for the microscope. The two plates of glass prevented it from curling up when it became dry; so in this way we were enabled to obtain the most interesting sections of the dentine in whatever direction we desired. The above, as seen in the cut, was made as nearly in the direction of the tubuli as we could make it, and in the body of the tooth. Fig. 2 is a section of a large piece of decay, taken from a large molar, which was very much decayed, of a young person; it was partially dried and placed in the vice, sliced with a razor, cast into water, and placed between the glasses for examination, precisely as the specimen illustrated in Fig. 1. The only difference between the two specimens is, that the tubuli in the specimen made from the decayed dentine are better defined than the one acted upon by the acid. The latter specimen seems to have had the tubuli somewhat broken or torn by cutting: whether the vitality of the tooth had anything to do in maintaining the regular arrangement of the tubes in the tooth undergoing decay, we know not; but we fancy that it had. We cannot help believing that dentine, deprived of its earthy constituents in a living tooth, still maintains its *vitality*, and that *living nerves* are still present, and require *killing* before the decay can be removed without pain. This view of the case forces itself upon us every hour in the day; the majority of patients cannot bear the removal

* The figures will appear in the February number.

of the decay from their teeth until something is placed in them to obtund the sensibility first, without great, and sometimes unbearable, suffering. To what is this owing? Certainly to the presence of nerves, at least such we must consider it. The dilute acids which carry away the earthy portions of the dentine are not strong enough to destroy the nerve filaments as fast as they are exposed. Besides, the acids which act upon the tooth substance out of the mouth in a single day, as much as would transpire in the mouth in a month or more, will not destroy the sensibility of the dentine when we are treating it, no matter how often they are applied; hence it is necessary to apply the most concentrated acid to accomplish the object; in other words, an acid capable of destroying the lime of the tooth will not destroy any nerve tissue of the tooth, or any tissue of the body, is a partial, if not a conclusive proof of the assertion. If a concentrated acid be applied to a tooth and left, say twelve or twenty-four hours, only a limited portion of the decay can be removed, when the acid must be applied again and again, until the whole of the decay has been rendered insensible, so as to completely effect its removal. We admit that this may appear quite absurd to those who do not believe in the vitality of dentine. We cannot succeed in our practice unless we take this view of the subject. We will acknowledge ourselves under everlasting obligations to any one who will instruct us how to succeed otherwise. There is a dark subject here in practice, unless such view is acknowledged. Some assert that it is only decay which is sensitive, and which must be removed; that view we cannot receive. Sound dentine has a high degree of sensibility in its normal state, but can be much exalted by friction and irritating substances, such as dilute acid of fruit, medicines, etc.

(To be continued.)

DISEASED ANTRA.

BY WM. H. ATKINSON, M.D.

Read before the Society of Dental Surgeons of New York City, at Cooper Union,
June 8, 1864.

BEFORE we are able strictly to define the diseases of the antrum, it is necessary for us to understand what constitutes its non-diseased or its healthy condition; and to know how to pronounce with certainty that this cavity is properly performing its function, it would much facilitate our aim to know just what this function is; for any deviation from this normal action will define and constitute one of disease in the degree of its presence. It has been suggested that it was a mucus cavity of reserve for lubricating the air-passages of the nostrils, so liable to become dry and irritated by air and the impurities floating therein. Some regard it

as a mere cavity hollowed out to avoid the weight of bony or soft tissue; while others regard it as essential to olfaction and voice. That it is lined by a duplicature of the Schneiderian membrane, is beyond dispute, which favors the fancy. This function, like fancy, is too indefinite, indifferent and occult, like that of the spleen, to be apprehended by and proven to the crude and material apprehension when not incited by high states of inspiration. The antrum and the spleen gather types of organs as cells collect and preserve types of tissues. This may, therefore, be regarded as the function par excellence of this "eddie of voice" and "re-current wave of aromal ether," both of which are incidental to as well as complemental of the one particular unseen and almost spiritual act. The great variety, in size of this chamber, and in the thickness of its bony walls, affords such difference of power of resistance to mechanical and other forces which are liable to act upon it, that a great range of difference in condition as to dryness and other states may exist, and yet be regarded as within physiological activity. Still, a certain size of chamber and thickness of parietes, soft and bony, will indicate the standard of health for particular constitutions and temperaments; any deviation from which will indicate abnormality. Thus what would be a mark of health in one would be the reverse in another person. Therefore, to diagnose health or disease of these cavities, it becomes imperative that we be able to pronounce upon healthy and unhealthy mucus and pus, sanies, etc. And just here a necessity of correct nomenclature springs up to avoid tedious and useless discussion and vexatious delay in the pursuit of our purpose to delineate the diseases, causes, symptoms, and treatment of the antrum and its immediate neighborhood. If, as I have repeatedly said, no disease can exist without some stage of the inflammatory process being present, it is evident that all pertaining to this process necessarily involves the idea of pathological action. And this at once denies the correctness of the term "healthy pus." So also of "mucus;" when properly defined it must be purely physiological in character, although, for want of erudition and means of elucidation, we use the terms "healthy" and "unhealthy mucus."

It is now plain that if we propose to investigate diseases of the antrum in anything like a satisfactory or instructive manner, we have undertaken an herculean work, involving the deepest laws of nutrition in all its phases of normal and abnormal display of its power. If nutrition be exclusively the work of cell upon the materials within its reach, it becomes important for us to understand the character of these materials, which limit the possibilities of cell productions; for this is the field in which renovation and deterioration marshal their forces, and gain or lose the control of the constituents of the body. If we hope to rise above the baldness of an arrant empiricism of following the letter of formulæ, this is the complexion to which we must come, viz., be able to

read the principles which underlie and control the acts of nutrition in cell, tissue, organ, and system.

So soon as this shall have been attained we will be masters of our calling, and be able to apprehend that all medication is but an intelligent supply of cell food in harmony of consentaneous activity in all the tissues, establishing local health upon which the general health depends. This border land between physics and metaphysics has been too much ignored by the advocates of mechanical theories as well as those favoring dynamical theories of health and disease. It is a repetition of the ancient folly of philosophy despising practical manipulative art, and thus ignoring the philosophy by which it alone could be guided into a safe course of procedure in practice. Genuine familiarity with disease deprives it of most of its horror and much of the danger it threatens, and affords the only sure basis of successful management when it becomes established in the system. As a general rule, it has made considerable progress before it is discovered or even suspected by the subjects thereof, especially in case of benign tumors of this cavity. Could we but detect the tendency to deterioration and correct that, we could insure health to every patient to an indefinite length of time. Nay, more: could we detect the first few cells deprived of the proper quantum of life presence, and then supply the proper regimen, the aberrant action would be overcome, and health would certainly be re-established before malignancy of type should be able to develop itself in a single cell to the degree enabling it to propagate its malign self upon its neighbors, and thus we should insure immunity from disease. The very fact of many cases of malignant disease having been brought under by the constitutional forces, unaided by remedial means, has been the efficient cause of delays in others not so well endowed with constitutional vigor, and thus abundance of cases of disease are constantly extant. The idea of tying the vessel supplying the morbid part with blood, hoping that the privation would cause atrophy of the diseased growth, had its origin in correct apprehension of the nutrient law, and is akin to the abstemious requirements made by all varieties of medication by all sorts of medical men, who treat derangements of the nutrition of the living body.

The line of demarkation between healthy and diseased action (the physiology and pathology) of this cavity is not better defined than the same line in other portions of the human organism; and hence we are forced, for the present, to confine ourselves to very general instruction to avoid diseased conditions of these parts on the one hand, and the enumeration of states of departure from health after they are patently pronounced on the other. When this shall have been faithfully done, we will be in possession of the data from which to construct a code of "institutes," which will always lead us in the right direction to prevent, apprehend, and remedy the evils to which our charge stands exposed. And

as all forms of disease have their portal through perversion of "nutrition," it is evident that if this be sedulously studied, comprehended, and secured, we have all the possibilities of disease within our apprehension and control. The inception of derangements here, as elsewhere, may be said to be:—

1. Local deficiency of functional activity.
2. Systemic reaction upon the location where the debility is—
 - a. Restoring at once the lost balance, or
 - b. Setting up adventitious nutrition which expels morbid influences, and thus restores the balance by profluvia; or
 - c. Maintaining a lower grade of cell action of the part, or by propagation of the secerning or entire system, rendering the perverted condition a chronic one.

As the cells composing tissue gather organizing presence and elaborate the indifferent blood-column (mucus) into their own proper bodies, it is easy to see that purity of cell-stock and purity and sufficiency of well-prepared blood are necessary to give us the standard of healthy cells, without which all the resultant bodies partake, of necessity, of the condition of stock and pabulum. Thus unhealthy stock of primordial cells converts pure blood into inferior or diseased structures on the one hand; while impure blood impresses its own deficiencies upon the cells which appropriate it. So we have two generic sources or portals through which pathological actions may and do introduce themselves into our antra and other portions of our highly complicated organism.

The simplest form of recognized apparent disease of the antrum may be said to consist in deficiency or excess of the normal mucus of its membrane; the former producing dryness and consequent irritation, which usually is but the inception of the latter, in an excessive flow of normal or altered mucus, usually called catarrh. As hinted before, in good constitutions this is the method nature takes to rid herself of the unwelcome presence that incited this unusual activity, which, when she has accomplished, health is re-established, and all goes on as before. But where the constitutional vigor is hereditarily deficient for this display of benignant power, or where deficient feeding or bad feeding, or other deteriorating habit, has rendered the system incapable of thus expelling the enemy, we may not have so favorable terminations to such cases; but, on the contrary, we are most likely to be troubled with one sort or other of chronic disease, as sequel to the acute stage which we have been delineating. From this point we branch off into great variety of states, which have been recognized as distinct diseases; with how much justice, we may determine by a close reference to what precedes in this paper.

Next to simple catarrh may be placed, in the departure from healthy function, cartarrhal profluvia mixed with pus; next to that, principally pus, with little or no mucus. After which, a still greater deteriora-

tion of the excretion, denominated sanies, which is the disintegrated blood-column, too low in life endowment to present even the indifferent life of a pus-globule, mixed with the corroded tissues, over which it passes in its exit from the circulation. This may merge into or be epithelial cancer, limiting by the dreadful distinction the sort of actions in this particular direction of deranged nutrition of the antrum. Adventitious growths of this cavity may next engage our attention, which may be divided, first, into hard and soft, and second, into benign and malignant productions in this locality, consisting of first, hypertrophy of the osseous walls, epithelium, and cutis vera, constituting the so-called exostosis and benign polypus of this chamber, which sometimes merges into osteo-sarcoma and malignant polypus of dreaded presence. Each one of these stages of modified deterioration of the nutrition of these tissues in this hidden recess of the human body might well occupy many pages, closely written, to adequately delineate even the simplest of them, to say nothing of the multifarious forms of syphilitic degeneracy and death of the bony walls of the antrum, and the other bones of the face, which can only be named in a paper of such limited extent as this must necessarily be. If occasion permit, I will give somewhat in detail a few cases of malignant polypus and syphilitic disease of this cavity, which have fallen under my notice and treatment during a practice of over a quarter of a century. Till then, will you, gentlemen, allow me to dismiss the varied and complicated subject of "diseased antra."

THE DENTIST'S DUTY TO HIMSELF.

BY C. A. MARVIN, D.D.S.

Read before the Brooklyn Dental Association, November 16, 1864.

THE favor with which you have received my former papers encourages me to present this, the third and last of the series which I proposed writing on this general subject of The Duties of a Dentist.

Much, if not all, that I have said in the two papers before offered, both in reference to the duties of a dentist to his profession and to his patient, may, by construction, be considered as part of his duty to himself. For, whatever affects his profession, affects him; and whatever impressions are left upon the minds of his patients by his method and manner, certainly can affect no *other* than himself. But although this may be so, there is a separate and independent bearing of this question upon the practitioner himself: one which he need not share with any one else; one which belongs to him, by virtue of his position, as the *practitioner*. It is this:—

To maintain perpetually and above question his character as a gentleman and a thorough dentist.

To do the first part of this twofold duty, (viz., to maintain his character as a gentleman,) it is obviously necessary that the dentist *be* a gentleman. And I use the word not in its modern signification. The word "gentleman" has come to mean, in the vocabulary of the present day, a *polished* male member of society. Suavity of manner, grace of motion, elegance of language, a full and perfect acquaintance with the rules of etiquette,—these are considered the indispensable and certain marks of a gentleman; while the individual, so urbane, so graceful, so elegant, and who never offends against the etiquette of a dining-hall or a ball-room, may be, at heart, a cheat, a gambler, a seducer, without a spark of honor, or a noble principle about him.

Such is not my gentleman. I mean just what the word signifies, when analyzed, a *gentle man*. First, a *man*. That is the foundation. Then the gentleness, the polish afterward. My gentleman is made out of a *man*—not the form of a man, nor the speech, nor motions of a man, but a man—a *whole man*, a human being, with a heart in him beating with noble impulses; the bearer of his Maker's image, and carrying within him the determination that, so far as he is able, that image shall never be degraded by being made the vehicle of a mean, ignoble soul. Conscious of rectitude within, he fears not the face of man in public, nor the searching eye of prying curiosity in private. Such is the foundation. Now polish him. Give him education, give him the culture of refined society, give him the books on etiquette, (though he need them only for the general forms, the details his own true nature supplies,) and you have a gentleman worthy the name. Such a gentleman should every dentist be. There is no profession in the whole catalogue which so much requires that its practitioner should be a *gentleman* as the dental profession. The closeness of contact with his patients into which a dentist is brought renders a strict observance of all the points of gentlemanly character necessary. We all know how expressive the eye is, and how the thoughts of the mind are written on the face. When, therefore, the whole countenance of the operator is so constantly under the scrutinizing eye of his patient, how important that his thoughts should be pure and his intentions honorable; that his face—that index of his heart—bear on it no impress but what is noble and true!

To preserve his character as a gentleman, the dentist will observe neatness and cleanliness of person. A clean face, a clean, sweet mouth, well-brushed hair, and, above all, *clean hands* should be the invariable, *absolutely invariable* possession of a dentist when practicing at his chair. And no amount of business, no pressing hurry, no number of years of practice, nor height of eminence, should ever make him regardless of these particulars. The eyes of our patients are upon us. Our every motion is scrutinized. Every finger and finger-nail is seen. And if an unclean hand, or finger, or nail is brought in contact with the cheek, or carried into the mouth,

of a sensitive lady, she experiences a feeling of disgust, and the operator is set down as a careless, dirty man, and neglectful of the first requirements of a gentleman. Nor can we pronounce the verdict harsh or untrue. In his character as a gentleman, the dentist is bound to respect the feelings of his patients, and the more bound from the fact that they are so much in his power. The dislike of having a dirty finger in one's mouth is not a mere whimsical, silly notion, but a legitimate feeling inseparable from a refined, delicate organization. Right here let me lay down this principle: *A dentist should be willing to allow no person to surpass him in refined feeling.* If he have it not by nature, let him cultivate it by every means in his power.

In the practice of his profession, he is brought into contact with people of all grades of society—the high and the low, the learned and the unlearned, the coarse and the refined. He should be qualified to meet all without embarrassment, without a feeling of inferiority or ignorance upon any point legitimately connected with his duties. This is the very lowest degree of qualification with which he ever should be satisfied. But a higher measure of attainment than that which will *barely* suffice should be his aim. And especially is this so in regard to the grace which I am now discussing—that of refinement.

To be able to give an opinion or advice in clear, chaste language, so as correctly to impart the idea without offending the delicacy; to seat and adjust a patient in the chair with that ease of manner and propriety of suggestion which will insure compliance and yet create no dislike; to handle the head, touch the lips, arrange all the necessary appliances for the operation, so as to convince of the *necessity* of such actions, and yet give no impression of rudeness or indifference; in short, to secure every advantage of position of head, mouth, or body which the operator may desire, and yet manifest a constant regard for the comfort of a patient, and for the principles of propriety,—this faculty proceeds from refinement, and does more to justify the dentist's claims as a gentleman than much fine broadcloth and a profusion of jewelry.

Style of conversation, too, enters into this analysis of gentlemanly deportment. Coarseness of language, harshness or abruptness, in giving the directions and cautions so often necessary, are to be avoided equally with rudeness of manner and a boisterous tone. *Much* conversation is not necessary to prove the dentist a gentleman; but what *is* said should be clothed in chaste language, conveying the idea as intended not only, but proving that he who speaks is fully possessed of refined feeling. Regard will be had too, by the gentleman dentist, to the proximity of his mouth to his patient's mouth when speaking. It is not pleasant to have people breathe in our faces at the best, especially from an open mouth. It is the part of a gentleman, if so situated that his breath must be felt upon the face of his patient, to make his words few, and, when

done speaking, to close his mouth, and use the nasal organ for purposes of respiration.

According to Scripture, it is "the *little foxes* that eat up the vines."

In judging of men, we are led to a far more correct decision by noticing the small traits of character than the great ones. In a *studied, artificial* character, these little points are often left unguarded, while the more prominent ones are carefully schooled. A gentleman of true refined feeling needs not to be *told* to omit none of the little things that belong to refined deportment. He feels the omission as quickly as another sees it. But we are apt to grow careless about matters of every day's experience, and hence it does us no harm to review them or have them reviewed from time to time; and, as little matters are of so much importance in affording correct judgment of men, I allude to them in this paper, making up, as they do, so much of the character of the gentleman dentist.

Attention must not be wanting to neatness not only of person, but of all the appointments of the dentist's office. Instruments, napkins, and everything ever used demand close and careful attention, that they convey no idea unfavorable to the character which I claim the members of our profession are bound, in duty to themselves, to sustain. In duty to themselves I say; and this is true, whether we regard them as belonging to a respectable profession or simply as members of society. Every man ought to be a gentleman, whatever his calling or his circumstances. The strong-armed blacksmith, with smutty face and dripping brow, is not at all unfitted for his laborious tasks by having true gentlemanly feeling within his breast. Men in the roughest garb and the humblest walks of life have displayed traits of gentlemanly character that would have graced the bearing of a prince. Therefore, as refinement of feeling does not ill become any station—and does well become high station—as men (viewed as members of society merely) are rendered more agreeable by its possession, certainly then the dentist has a double obligation resting upon him to cultivate and manifest in all his deportment those beautiful traits of character which show the gentleman, and which will command a favorable verdict from all with whom he is brought in contact.

So much for this part of his duty. But there is another and equally important part in the proposition I have given. Let me repeat it:—

To preserve perpetually and above question his character as a gentleman and a thorough dentist.

It is not enough that he prove himself a gentleman. His duty to himself is not then done; he must prove himself a thorough dentist. I have placed these two points of obligation side by side in my proposition, that their compatibility may be seen.

It is thought by some that the gentleness, urbanity, and delicate language of which I have been speaking are rather inconsistent with the

dignity of bearing which properly belongs to the practitioner of conscious eminence, and that he stoops a little if he regards his patient's feelings much or pays great regard to the minor matters already enumerated. It is not so, gentlemen. And it is that these two lines of conduct may be studied and harmonized that I have coupled them in my statement of duty. We have looked at the first; let us look at the second.

In order to prove himself a *thorough dentist*, I assert, as before, the practitioner must *be* a thorough dentist. There is no use in a professor of a science or a practitioner of an art endeavoring to prove himself thoroughly acquainted with that science or art if he is not. His deficiency will show itself when he least expects it, and all his assumption will only secure for himself greater mortification. The first requisite, therefore, is to *be* what he professes to be: a dentist—a *thorough* dentist. What that is it is not necessary for me to define. It is well understood in this Association,—as well, I firmly believe, as in any association on the continent. No half-way attainments will satisfy the man who is determined to be equal to this part of his duty. He will aim higher and higher constantly, “Excelsior” being on his banner. To him knowledge gained will be but the spur to greater acquisitions, while broader views and keener perceptions will be esteemed but as instruments of so much the more value for penetrating into the mysteries of knowledge which lie still beyond. To impress the minds of his patients with the conviction that he is worthy of confidence and trust, several things are necessary:—

1st. The dentist must be able to give an intelligent reason for everything he does. Many questions are put to him by his patients,—prompted sometimes by curiosity, sometimes by nervous apprehension, sometimes by a desire for information. He should be able to give an intelligent answer. Not that he is always bound to enter into a full explanation, nor that it would always be wise to do so. And here these two heads of duty show themselves. An abrupt refusal to satisfy the curiosity, or a total silence, is not gentlemanly; while a complete answer would consume too much time. On the other hand, high-sounding words and technical terms, conveying no meaning, would indicate the want of the necessary knowledge. Some wisdom is needed to give an answer that shall be courteous, brief, and satisfying, or to parry the question if occasion require:

2d. The dentist should pass from one part of his operation to another with composure and perfect self-confidence. Patients study the countenance of the operator, and an expression thereon of uncertainty or hesitation, weakens confidence; while self-reliance and resolution, even amid great difficulties, inspire trust. Many weak-nerved patients suffering from pain or difficulty which they do not understand, are reassured and quieted by the composed mien of the dentist, when if he appears surprised and nonplused by their story, they at once conclude their case to be an exceedingly serious one, and him unqualified to manage it. New and

grave difficulties are constantly arising ; these he should meet and seek to overcome with quietness and determined perseverance.

3d. The dentist should pursue his own plan of operation steadily and unswervingly to the end. Many are the suggestions which some patients offer, and doubtless they think them valuable. As a gentleman, the operator never ridicules them, nor by his manner pronounces them silly, though he may so regard them. As a thorough dentist, he quietly pursues his own way, nor suffers himself to be at all diverted therefrom.

The subject is inexhaustible, gentlemen ; but I have said enough, I think, to indicate my views upon it, and to open the field for your further thought and investigation. A constant regard for these two leading points of duty will tend to increase the efficiency of every practitioner of our noble art, and increase also his reputation among those who enjoy his services. The inward consciousness, too, of being faithful to himself and to those who come under his charge will be an ample and perpetual reward for whatever of labor and study he may devote in making and keeping himself a perfect gentleman and a thorough dentist.

THE MALLET AND MALLET PLUGGING.

An Essay read before the Massachusetts Dental Association.

BY I. J. WETHERBEE, D.D.S.

"I PROPOSE to set forth in this paper my views of the use of the "mallet" for the impaction and condensing of gold in the insertion of plugs in cavities in the teeth.

It is but recently, or at most a few years only, that the mallet has been in use. I think to Wm. H. Atkinson, M.D., then of Cleveland, Ohio, but now residing in the City of New York, is due the honor of introducing it to public notoriety. He has several very respectable converts who are walking in his illustrious footsteps. This number may be increasing very slowly ; for we well know that all great reforms have very many obstacles to overcome. Both time and patience are requisite to effect the object in view ; and although often long delayed, they bring with them, when attained, the rich harvest of ample satisfaction.

It will doubtless be true, that when Dr. Atkinson shall have laid by or dropped the "mallet" and plugger, he will leave behind him many well-inserted gold fillings, which will command the respect and admiration of every able and polished practitioner of our noble art who may chance to see them.

As wave succeeds ocean wave, so the generation of dental practitioners who may come after us may award to the "father" of the "mallet" a meed of praise which is at present beyond the conception of the mass, and only appreciated by the few.

We may hope, at least, that the rising generation of dentists will not, in view of the increase of dental literature and the advanced stage of the art, have less wisdom, or use their skill to poorer advantage, than at the present day.

As light and knowledge increase, and become generally diffused, its effectiveness will be quite apparent to the most casual observer. Private instruction, to which may be added necessarily a collegiate course, will develop a full and well-rounded status, commanding the respect and confidence of all other professions to a greater degree than hitherto enjoyed.

But to the "mallet." The mallet is a well-turned and nicely-formed piece of *lignum vitæ* or *rose-wood*, about two inches in length and one inch in diameter. The handle is nearly one foot in length, or shorter, as the operator may prefer, and is usually made of the same kind of wood. When not in use, it might be taken for the *gavel* of the President of the Senate or Speaker of the House of Representatives. Indeed, it is quite as harmless as *quack medicines* when let alone. It is supposed to have neither volition or momentum, and becomes the merciless *tool* of adventurers, who, to show their superior wisdom, go in for *hammering demonstrations*, to the grief of sensitively-organized members of the dental family, who, when they demur, are exhorted to breathless silence: although the operation, by the use of the mallet, is prolonged to one-third or one-half greater length of time than is required by the old wisely-chosen plan of *driving the plugger* by hand.

If time is money, why this waste to both operator and patient? Why this terrible suspense continued from one hour to one hour and a half, with excited *salivary glands* sending forth many waters to the unbearable inconvenience of the patient and the disgust of the operator? Why disturb the equanimity of the patient by piling *napkin upon napkin* required by needlessly-extended operations? Perhaps the wise in their own conceit may answer, "that all conditions must subserve their purposes." This may be well, when duty compels; but if there is another way leading to the same practical end, then we are obliged, by the laws of humanity, to adopt the least disturbing course. Although the mode of operating, owing to the great diversity of conditions and circumstances, must be eclectic, yet a sound judgment added to practical skill should conserve the patient's comfort as well as the practitioner's success.

In the use of the mallet a second person is necessary, who is educated to apply force by the terms *hard*, *light*, and *soft*. To his attainment in skillfully applying the mallet in connection with the operator, the tooth is indebted for a good filling. But here arises a contingency. Only sixty-one hundredths of cavities, as they occur or exist in the teeth, are adapted to mallet filling. The balance must be plugged in the usual manner. If mallet filling is superior, the patient must, at no very distant period, be quite aware of the disparity between the two. Posterior ap-

proximal cavities in many bicuspid, first and second molars, the crown, and labial surfaces cannot be reached by the mallet process; hence the mallet is dropped, followed by a "God bless you" for an hour's comparative quiet. It is, however, denied, by the advocates of the mallet, that it gives the patient greater inconvenience than the old method of operating, to which I respond that, by personal experience in the use of the mallet for the insertion of a plug in the anterior approximal surface of the left inferior second bicuspid, I suffered far greater inconvenience, owing to the varied force of the mallet, as also in the increased length of time required to perform the operation with three napkins packed together, as a necessary preventive against moisture.

Again, the position of the operator, in order to give room for the mallet, is often subversive of the patient's comfort, as was the case in my own experience. I could have plugged the same cavity for a patient in one-half of the time, and have done it equally as well. I am therefore free and without the show of egotism to challenge any mallet plugger for the mastery over the plugger properly driven by hand.

It is argued that mallet force gives better impaction to the gold than the old method, and with less strain on the tooth and socket. This I deny—*force is force*, whether it be sudden or gradual. The economy of nature, as illustrated in the *dental organism*, is a refutation of this unphilosophic claim.

The structure of the root of a tooth, and the formation of the maxilla, and the alveolar processes, show most conclusively a slightly elastic condition, which contributes to comfort in their use in the act of mastication or the biting of hard substances. Hand-pressure, if skillfully applied, is equally successful in obtaining the desired result; for gradual pressure combines sufficient elasticity of motion to make it far more agreeable and desirable to the patient. There is also far less danger in plugging teeth by hand-pressure, when the walls of the cavity and its margins are very delicate. The sense of touch to the educated hand, when pressure is applied, is a great safeguard against danger, and an assurance of correct manipulation.

The average force of the mallet is one pound and a half, which is requisite for the impaction of gold. By personal experiment with several patients, under the most favorable circumstances, I found its use disagreeable, with but one exception. By hand-pressure the average force employed is ten pounds, and often as high as sixteen and twenty pounds. In the cases above alluded to, there was no *flinching* when hand-pressure was applied; but when the "mallet" was used, they *flinched* and gave signs of "mallet woe!"

Again, it is said that our offices are unhealthy, both from confinement and bad atmospheric conditions; if so, the presence of a third person augments this evil, against which the patient has rightful claims for au-

dience as well as the principal in the operation. There is also necessarily an increase of expense in the employment of a third person, beside loss in the increased length of time required by the mallet process over the old rational mode of plugging by hand-pressure. It may be urged that it is not always necessary to employ a second person for malleter. Granted. But it is necessary in the majority of cases; hence the argument holds good. I admit that expense is not to be the governing criterion, but perfect work is to be aimed at in the use of means and modes employed.

I am of the opinion that not one dentist in ten has the *instruments requisite for perfecting first-class operations*, nor do I believe one in ten capable of forming or constructing and tempering instruments adapted to the diversified cases that come under our notice. Comparatively few instruments for plugging can be found at the dental depots adapted to the wants of the profession. The profession demands a great improvement. Manufacturers of dental instruments must be furnished with better samples or patterns, in order to work up to the requirements of well-informed and skillful practitioners of the present day.

Instruments for the use of the "mallet" are many of them better pointed than those made for hand use. Those who have taken up the mallet, really believe that the improvement is due to the mallet. A little more knowledge of the philosophy of mechanics would correct erroneous conclusions, and secure lessons of practical importance which it would be well for them to know.

In conclusion, I frankly admit that it is less laborious for the operator to use the mallet; many will, for this reason, adopt its use in their practice. If both they and their patients enjoy it, who shall object—provided they set forth their claim in truth and perfect it in righteousness?

In deeds, as fashions, the same rule will hold,
Alike fantastic, if too new or old;
Be not the first, by whom the new are tried,
Nor yet the last to lay the old aside.

PULP CAVITIES.

BY C. E. LATIMER, D.D.S.

"Prove all things, hold fast that which is good."

I AM forcibly reminded of the above when thinking over many errors in theory and practice obtained from my preceptor and others, which I have been, one after another, discovering and correcting; and it is with a view of calling attention to the importance of being "ready always to give an answer to every man that asketh you, a reason of the hope that is in you," that I trespass upon the pages of the DENTAL COSMOS.

Our ideas, and even language, are liable to become stereotyped, and we express views, as our teachers have done, time out of mind. I have adopted the rule, and would recommend it to others, especially to those who *always succeed*, of asking myself, Can I prove this idea? May not that opinion be a fallacy, after all? Is it susceptible of demonstration? I have been engaged recently in some investigations, the results of which have completely upset my previous opinions, and made me doubt whether I was really sure of anything; and, as some of your readers may be as sadly benighted as I was in this matter, I will lay the results of my research before them. In order that I might work more understandingly in removing the pulps from fang canals and filling them, I collected a number of teeth of the different kinds, and cut them up with saw and excising forceps, in order to show the shape, position, and size of pulp canals, when, to my surprise, instead of finding but two canals in the inferior molars, as I always supposed, I found as follows: Whole number of inferior molars, (all having the usual two fangs,) thirty-four, of which three have four nerve canals, nineteen have three canals, and twelve have two canals. Of these twelve, seven have, by deposit of dentine down through the centre of the anterior fang, nearly produced the three canals; and of the remaining five, three look as though they might thus close up and make three canals, leaving but two, which probably never would have had more than two nerves. From the twelve teeth having but two nerves, I find eight with the large openings at the apices, indicating young teeth. Those with four nerves were evidently very old teeth, with exceedingly small nerves. From what I have been able to learn, I come to the following conclusions: That the inferior molars originally have but two nerves, but at about a certain age, (yet undetermined,) as calcification progresses, the nerve in the anterior fang becomes divided, beginning at the apex and proceeding upward, forming two nerves, and occasionally, at least at a later period, the posterior nerve may be divided in the same manner. The same rule holds good, I think, with respect to the second superior bicuspid, although I have not yet been able to examine a sufficient number of these teeth to state positively. Nearly all examined thus far, however, have the two canals. I have commenced classifying those which I extract, according to the age of the patient, and hope to obtain, thereby, something definite upon this subject; and, permit me to suggest to others that, by a simple method of classification, they may be very materially aided in filling fangs. I take a common tooth-brush box and pour a little melted max in the bottom, then, after clipping off the fangs so as to show the pulp canals, warm and press them into the wax in regular order, the different kinds by themselves. A good assortment well studied will, I hope, increase the ratio of our success. Of course I do not write for those who "always extirpate the nerve thoroughly, and fill solidly with gold to the apex of the fangs."

NEW YORK, December, 1864.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF
PENNSYLVANIA.

REPORTED FOR THE DENTAL COSMOS BY R. J. HOFFNER, D.D.S.

A MONTHLY meeting of the Odontographic Society was held Tuesday evening, December 6th, at the Philadelphia Dental College, Dr. W. P. Henry in the chair.

Dr. James Harris was unanimously elected an Honorary Member of the Society.

Dr. Moffatt of Harrisburg, presented an upper set of teeth, on a platina base, somewhat similar to continuous gum work, and which he styles non-sectional block work. It differs from ordinary continuous gum work in the fact that the gum and teeth are carved from one piece, and the material composing them are of such a nature that there is no danger of warping the case by shrinkage during baking. The body material is so weak that it will tear and not move the plate, while it has strength enough for all the ordinary requirements in an artificial substitute. The breaks in the case can then be readily repaired by a second baking, after the addition of a sufficient amount of the proper material. This work was patented in 1860; but Dr. Moffatt has no desire that it shall be withheld from the profession on that account. He patented it for the purpose of having the fact of its being his invention recognized, and is now willing that the profession shall have the full benefit of it.

Dr. Flagg moved a special vote of thanks to Dr. Moffatt for his present, and especially for his liberality in allowing the profession to make full use of his improvement. He was opposed to patents in general when taken out by practicing dentists; but thought that Dr. Moffatt had shown his wisdom in securing for himself the recognition of the improvement as his own, while he did not withhold it from his fellow-practitioners.

Dr. Tees said that, as proof of his sincerity in stating that he wished the profession to avail itself of his invention, Dr. Moffatt was ready at any time to give instructions to any who might desire to learn the process by which the work that he had described was done.

The following paper was then read on

"SALIVA."

BY R. J. HOFFNER, D.D.S.,

DEMONSTRATOR OF OPERATIVE DENTISTRY IN THE PHILADELPHIA DENTAL COLLEGE.

The salivary glands, as they are denominated, are those organs which secrete the fluid peculiar to the mouth. They are three in number on each side, named respectively the parotid, submaxillary, and sublingual glands. The former is the largest, and is situated below the lobe of the

ear, extending upward into the posterior portion of the glenoid cavity, forward over the masseter muscle, and downward to the angle of the jaw. The duct through which it pours its secretion into the oral cavity is that of Steno. It passes forward and downward, across the masseter muscle, to its anterior border, where it turns inward, pierces the buccinator, and empties into the mouth opposite the superior second molar tooth. This duct is from an inch and a half to two inches in length.

The submaxillary, the next in size to the parotid, lies below the mylo-hyoid muscle, in a depression, just within the base of the inferior maxilla. The duct of Wharton, (about the same length as that of Steno,) which carries its secretion, passes first backward around the mylo-hyoid muscle, then forward to its termination at the side of the *frænum linguæ*.

The third and smallest of the salivary glands is the sublingual, which lies on the floor of the mouth underneath the tongue, and to one side of its *frænum*, extending backward to the submaxillary. It is easily perceived by the projection which it makes into the mouth just below and behind the inferior incisor teeth. Its communication with the oral cavity is by means of several ducts, known as the ducts of Rivini.

The supply of blood to these glands is obtained by means of the external carotid, which passes through the parotid; the facial, which extends into the submaxillary; and the sublingual, which gives some of its smaller branches to the gland of the same name. The nerves distributed to these glands are derived from the trifacial. The auriculo-temporal passes to the parotid; the lingual nerve supplies the sublingual, and filaments from the submaxillary ganglion pass to the submaxillary gland. These nerves are all branches of the inferior maxillary, which is itself derived from the trifacial.

There are, besides the salivary glands, a number of mucous glands scattered over the whole lining membrane of the oral cavity, and the secretion from these organs passes into the mouth in common with that of the salivary glands. Most of the mucous glands are simple follicles, each opening directly into the mouth by its own duct; but the structure of the compound mucous and salivary glands is described by Kölliker as lobulated or racemose, resembling a bunch of grapes in the manner of their construction. Each separate lobule has its own duct, and a number of these pour their secretion into a single duct, which again passes on to be connected with the main trunk, to pour the accumulation of fluid thus collected, into the mouth.

The glandular vesicles are not always rounded in shape, but frequently present an elongated or pyriform appearance, due to the constant pressure to which they are subjected. The different shapes which these lobules take is so varied that Kölliker says "it is impossible to describe at length the forms which they assume." The lobules of these glands are bound together by an investment of cellular or areolar tissue which, in the

parotid, holds them more closely in contact than in the submaxillary, and in the submaxillary more closely than in the sublingual. The structure of the lobules in both the latter-named glands is coarser than in the former. The ducts of the organs are composed of fibrous tissue, lined with columnar epithelium.

It is now a matter of importance to know the manner in which the secreted fluid can be obtained in its purest condition. To do this many devices have been resorted to. The fluid, as obtained directly from the mouth, is, of course, not fitted for examination, as the contents of both the mucous and salivary glands are collected together, mingled with the epithelial scales which have been detached from the lining membrane of the cavity. These broken epithelial scales can easily be detected, even with a microscope of low power, presenting an irregular appearance. The secretion from each gland can be got by placing a canula in the mouth of the duct from which the saliva is wanted, and then by irritating the fauces the fluid will readily flow. Even in this case, however, it is liable to be contaminated with a little mucus and some of the epithelium which have found their way into the mouth of the duct. The best manner of obtaining the secretion pure is by establishing a fistula, from which it can be taken before reaching the mouth. This means, of course, is not available in the human subject. When obtained in this way, the secretions from the parotid and sublingual glands were found to be clear and limpid, while that from the submaxillary was thick and viscid, "resembling," according to Piggot, "simple syrup both in color and consistence." The mucus was obtained by tying the ducts of all the salivary glands, and then scraping the exuding secretion from the membranous surface. It is much thicker in its consistence than even the secretion from the submaxillary, and adheres so tenaciously to the sides of a glass vessel as not to admit of being poured.

Much discussion has ensued among physiologists as to the amount of secretion which takes place in a given time, say twenty-four hours. The range through which experimentalists have gone in placing their estimates upon such amounts, is indeed great if we compare the lowest and highest given quantities. In making these observations a difficulty arises, for the rapidity of secretion is affected by so many causes that it renders the determination of the true amount secreted a matter of doubt. Thus the mechanical action of the jaws will permit of an irritation sufficient to allow of a secretion of the fluid; the presence of food in the mouth has a decided tendency to increase it, and this tendency is different in different cases. If the food be hard and dry, the amount of saliva necessary to render it in a condition fit for deglutition is much greater than that demanded for food in which the fluid constituents are markedly present. Mental emotion exercises a peculiar effect upon the amount of secretion, acting differently where the emotion is itself different. Thus,

for instance, if the emotion be that of pleasure, the secretion is full and rapid; but if it be the opposite, it will be lessened, if not entirely stopped. It was for this reason that the celebrated rice test, as it was termed, of the Hindoos was practiced when the detection of a criminal was attempted. If the guilty party had filled the mouth with rice, the emotion of fear, incidental to crime, would be so great as to prevent a secretion of saliva, and the rice would be returned from the mouth as dry as it went in.

The affection of the mind, in influencing the flow of saliva, is manifested in still another way; for even though food be not placed in the mouth, the simple thought of it is sufficient to produce quite an abundance of saliva. Then again, during sleep, the glands remain in a passive condition, and at all times, when at rest, the tendency to secretion must of necessity be allayed.

Removed as much as possible from all exciting causes, and when the experimenter has made the requisite provision for instituting his researches, he cannot isolate himself from his thoughts, which will, in all cases, have a tendency to influence the secretion, and as his emotions may be varying, so will the secretion vary with every passing thought. With all these difficulties to contend with, it is easy to comprehend that the results are but approximations, much nearer in some than in other cases. According to Mitscherlich, the amount of secretion was about 20 oz. in the twenty-four hours. This was his deduction from the amount obtained by means of a fistula of the duct of Steno, which yielded $2\frac{1}{2}$ oz. in the twenty-four hours. He then ascertained that the amount of saliva secreted might be about six or seven times that secreted by the parotid. Carpenter estimates the quantity of secretion to be from 15 to 20 oz. Bidder and Schmidt, whose experiments in this direction are entitled to much credit, have given the amount secreted during twenty-four hours, deducting for the proper amount of sleep, as about 3 pounds. This they determined by actual and careful experiment upon the human subject, and found the yield for one hour to be a little over 3 oz. troy. Jacobowitsch, who has also given attention to the secretions of the mouth, discovered that though the amount of secretion may vary, the solid components, held in solution, remained almost invariable. According to the experiments of this physiologist, "the solids discharged by each pair of glands amounted to about 3.581 grs., of which 1.235 grs. was organic, and 2.346 grs. inorganic matter." Dalton gives it as his experience, that he has never been able to collect more than 556 grs., or a little less than $1\frac{1}{4}$ oz. troy in an hour.

From these conflicting statements, it is easy to infer that some difficulty must arise in the pursuance of investigations, and the probability is, that though the experiments of the different observers may have been accurate, yet the extraneous influences in each individual case gave rise to a dissimilar result.

I have before stated that the secretions from the separate glands were, in each, of unlike consistency. This is due to the peculiar organic principle, known as ptyalin, which characterizes the salivary fluid. In the parotid and sublingual glands this organic matter is more thoroughly fluid than in the submaxillary; hence the viscosity of the latter secretion over that of the two other glands.

The chemical composition of the saliva has been tested by various analyses, and the results have coincided in almost every case. On an average, in one thousand parts of saliva, about 990 are water, and the rest is made up of ptyalin, mucus, the salts, and extractive matter, which latter shows but a trace. Some of these analyses have been more complete than others, but in all there is a close similarity. In the saliva we have, as in other instances throughout the economy, a combination of chemical substances, many of which would not unite by ordinary chemical affinity. It becomes of interest, then, to determine by what means this combination is effected; but it would seem that natural laws have failed to make this matter clear, and physiologists have fallen back upon the assertion that it is due to vital influence; beyond this great life principle, which gives to the otherwise useless fabric of man its power to think and act, he cannot go; and until he reaches a similitude nearly allied to Deity, will it remain an enigma to man. When, however, an unexplainable phenomenon occurs in the human organism, the physiologist is apt to cloak his ignorance under the assertion that it is due to vital action; but ask him to explain this vital action, which is, to make clear the great secret, and he is dumb. Dunglison, in his *Human Health*, says, after mentioning the various constituents of the saliva and urine: "All of which must have been obtained from without, and many of them combined within the body by ordinary chemical affinity, controlled, however, in all probability, by vital influence, but, in what manner, we know no more than we do of vital processes in general. When we assert that the operation is *vital*, we have expressed the limit of our knowledge, and the term is too often employed to protect our ignorance when a better examination or understanding of the subject might have enabled us at times to present a more satisfactory explanation, founded upon physical laws."

The saliva, when mixed with mucus, just collected from the mouth, is a slightly viscid fluid, with a faint blue tint, having an alkaline reaction. It is somewhat frothy, and holds in suspension numerous white flocculi. After standing awhile a white deposit falls, and the fluid above becomes clear. Treated with alcohol, a white precipitate is thrown down, and if mixed with nitric acid or boiled, the albumen it contains is coagulated. It is by most physiologists regarded as devoid of both taste and smell, though some contend that both these properties are evident. Those who hold to the latter opinion, state that the saliva which one's self secretes

can, of course, have to him no taste, but that if the saliva of another be used, its sapidity will be manifest. But the other class, and among them are some of the most reliable authorities, seem to think that this could be only with saliva which had become a little stale, a matter materially altering the result in an organic compound liable to decomposition. As regards the smell, I have never been able to detect it, after many attempts, and in those cases where any odor has been perceptible, the probability is that the fluid was in an abnormal condition.

Much discussion has arisen relative to the use of the saliva, and the very first experimental physiologists—those whose names have added lustre to the scientific world, and whose writings have been recognized as authority—have been at variance upon this subject. Some contend that the action of the saliva is purely mechanical; while others support the opinion that, by its chemical properties, it acts as an aid to digestion. This difference of opinion is founded upon a discovery made by Lenchs, of Germany, that the saliva converted starchy substances into sugar. Among the most noted of those who hold to the mechanical influence of saliva, and in this he is supported by Beaumont, is the famous French physiologist Claude Bernard. He found that the secretions from neither of the three glands, whether mixed or separate, would exert any influence upon amylaceous articles. From this he inferred that the chemical action of the buccal secretion resided wholly in the mucus. But the experiments of other observers proved that the mucus alone would not exert a chemical change. It requires to be united with the secretion from one of the other glands. Bidder and Schmidt found that, by mixing the parotid secretion with the mucus, starchy constituents were slowly acted upon; but if the submaxillary secretion and mucus were combined, no difference could be observed between the action which took place and that which occurred when common saliva was used, the rapidity of change in each case being very great. But, it might be asked, is not this change effected as well in the stomach by means of the gastric juice? The results of experiments have proved to the contrary. The stomachs of animals have been opened, and when due regard was taken to prevent the saliva from reaching them, starchy food placed within the stomach was unacted upon. But if saliva were placed in contact with it, the starch was immediately changed into sugar. Now the observations of physiologists have proven that starch, in its unchanged state, will not assimilate; and, therefore, if the action of saliva be to change starch into sugar, and if this starch must be changed to be assimilated, is it not fair to infer that the buccal secretion does, to some extent, aid digestion? But Claude Bernard has stated that this action of the saliva must be meagre, because the bolus of food will be in the mouth so short a time, that the saliva will act but imperfectly upon the whole mass. The experiments of physiologists have, however, determined that the action of the saliva is

so rapid, that but a minute is required for the conversion of the starch; and this, they say, can be proved by keeping in the mouth a small quantity of starchy matter, and the sweet taste, consequent upon the change, will soon be noticeable. Granting, however, that the change took place more slowly, it is hardly to be supposed that it would be begun and finished in the mouth; for, with the bolus of food, there must be swallowed a quantity of saliva, and the influence of the secretion would be as efficacious in the stomach as in the mouth. This power of the saliva to aid digestion is, of course, slight, as it has been stated that animals deprived of the glands have suffered no *material* inconvenience from irregularity of digestion, the amylaceous articles having been changed by the secretion of the pancreas.

The admixture of saliva with food in the mouth increases considerably the weight of the mass. This was determined by Bernard's experiments of opening the œsophagus of a horse, and removing the bolus, as it descended, when it was found to have increased eleven times in weight; the weight of the mass, before going into the mouth, having of course been determined.

That the saliva exerts a marked influence, mechanically, cannot for a moment be doubted; and in this respect it might be well to consider the action of the fluids in this direction. The viscosity of the submaxillary secretion would well fit it for holding the particles of food together and from its glutinous nature deglutition would be aided. Bernard is of the opinion that the submaxillary secretion is an important auxiliary in swallowing; and in this view Carpenter agrees with him, and asserts that, at the moment of swallowing, the submaxillary fluid is rapidly poured out. The parotid and sublingual glands secrete a fluid much more limpid than that of the submaxillary, and therefore, by intimate admixture with the food, furnishes a broader surface while mastication is being performed.

To prove the mechanical action of the saliva, Bidder and Schmidt tied the ducts of all three glands, and found mastication and deglutition much retarded, even when moist articles of food were taken. Bernard has also experimented in this direction. He gave to a horse a pound of oats, and having previously made an opening into the œsophagus, collected the bolus as it descended. This pound of oats was thoroughly chewed and swallowed in nine minutes, but on severing the parotid ducts on each side, both mastication and deglutition were impaired, so that the oats, which previously required but nine minutes' trituration, now required more than twenty-five minutes before they could be swallowed. Other observers have carried on these experiments, and, by tying the ducts of the different glands, have determined the length of time which it took in each case for certain articles of food to be thoroughly comminuted and swallowed; but these experiments only serve further to prove the mechanical part which the saliva plays.

In conclusion, I would state that in the foregoing I have drawn from many valuable works treating on the subject, and have, throughout the communication, endeavored to give full credit to the authors to whom I am indebted.

Dr. Ellis expressed his appreciation of the paper just read, and would refer briefly to a few points therein mentioned. The promptness with which the amount of salivary secretion is influenced by the emotions is a fact patent to us all, and this very familiarity with a subject will not unfrequently lead us to underestimate its importance and lose the benefits which might accrue from a practical application of our knowledge. No doubt every practitioner has recognized the intractability of the tongue in certain cases, and possibly observed that a simple mention of such a fact to the patient would lead to an aggravation of the difficulty. The same result attends the direction of attention to an undue secretion of saliva. A consciousness of these facts, therefore, would suggest the propriety of avoiding any exclamation which would be calculated to fix the attention of the patient upon the trouble, for the action of the organs being more or less independent of volition would preclude the possibility of his being able to check either the movements of the tongue or the free secretion of saliva. From the fact that normal saliva is alkaline in its reaction, and when acid proves injurious to the integrity of the dental tissues, it becomes desirable that we should possess some method of recognizing its properties. He was aware that the viscosity of the saliva was taken as an indication of its acidity. This, though no doubt a valuable adjunct in such investigation, was unworthy of reliance, except in conjunction with the use of litmus-paper, or solution. With regard to the physiological function of saliva, he was aware that a great difference of opinion existed. He had assisted in a number of experiments performed upon dogs with gastric fistulæ, with the object of examining the properties of the saliva, gastric juice, etc., and the results were such as to confirm him as an adherent of the mechanical theory. He was aware that saliva possessed the property of converting starch into sugar; but the time required to effect that change is longer than food is generally retained in the mouth before deglutition; and, furthermore, any action of that kind which might have been inaugurated in the mouth would (as has been proven by experiment) be immediately arrested upon admixture with the gastric juice.

Dr. Flagg said that it could not be expected that he should discuss the nicer points of modern physiology; for all his reading, experimenting, and reflecting tended, from choice and habit, in that direction which treated of disease rather than ease, and took cognizance of action, which, while it was natural, was by no means physiological. It was, therefore, with marked pleasure that he had heard the essay of the evening, for it bore the impress of that extended and thorough research which invested

it with authority, and proved to his mind that the views which he entertained as to the almost entirely physical function of saliva were still held as of good repute, and thus far had escaped the general upturning which had taken place in so many directions of scientific investigation. The nature of the fluids secreted by the different salivary glands, their anatomical relations, and the experiments which had been referred to in connection with insalivation and deglutition, had, in years past, made what seemed to his mind clear presentation of the duty intended to be performed by them. Of course it could not be denied that starch was converted into sugar by maintenance for a time within the buccal cavity. This seemed to him, however, of so little moment, in comparison with the results of moistening the food and lubricating the passage through which it was necessary for the bolus to pass, that it was evidently insufficient to command much attention; but he would here beg leave to remind the members of the evidently putrescent nature of saliva. He desired to recall the peculiarly unpleasant odor given off from spittoons very soon after using, and he would ask if this fluid, so readily decomposed, might not be in this manner especially adapted to the purpose of offering no obstacle to that degree of decomposition on the part of nutritious material, which was necessary to the formation of chyme, to the end that its passage through the pyloric orifice might be permitted? He would suggest that in this light saliva might properly be regarded as at least a *negative aid* to digestion.

Dr. McQuillen stated that, as there were strangers present, it would not be inappropriate briefly to allude to the derivation of the name of the Society, and manner in which essayists were appointed. The term *odontographic* is derived from two Greek words, (*ὀδους*, *odous*, a tooth, and *γραφω*, *grapho*, to write,) and signifies a description of or discourse on the teeth, the Society being one in which discussions are held upon matters pertaining to the teeth. At the annual meeting of the Society, held in May last, the Executive Committee, as usual, appointed twelve gentlemen—one for each monthly meeting—to prepare communications to be read before the Society, this written communication to be the subject for the evening's discussion. The essay read to-night has been prepared according to such appointment, and was one of the regular series for the year.

The subject of the evening he regarded as an interesting one. With respect to the chemical action of the saliva, there is a diversity of opinion. In former times the weight of authority was in favor of this theory; but the investigations of Bernard are so minute and so exact that scientific men at present are, to a great extent, regarding saliva as mechanical in its action. While disposed to favor this view to a considerable extent, the presence, however, of an organic principle, *ptyalin*, would lead him to suppose that saliva must exert some chemical influence. He could

recall with pleasure numerous occasions when a piece of bread placed in the mouth, and which at first was tasteless, gradually became sweet and agreeably palatable by being kept in the mouth and subjected to a continued trituration and admixture with the salivary fluid, the glucose or grape sugar in this way being liberated through the agency of the ptyalin.

He remarked that at one time he had been in the habit of using lime-water rather frequently, and invariably found that shortly afterward there was a decidedly sweet impression in the mouth, though the first taste of the lime-water was disagreeable. This was a statement which he had never met in his reading, but thought that others might have noticed the same thing on taking this substance.

Sugar is found, to a greater or less extent, in different portions of the economy, especially in the secretions. Its presence in milk is readily recognized by the sweetness of that fluid, and chemical analysis fully demonstrates its constant existence in urine; the proportion being largely increased in diabetes. The amount of sugar in the saliva, although exceedingly limited, has been demonstrated by physiological chemists. He thought the quantity of saliva secreted in a given time varied with the amount of fluids taken into the system. These fluids must, of course, be eliminated, and no doubt a large portion finds exit by means of the salivary glands. In view of this fact, when going to perform an operation for a patient where the flow of saliva was excessive, he sometimes gave directions to the patient to take as little fluid matter as possible, and this he considered had shown beneficial results.

There is also a great difference in the saliva in so far as individuals are concerned. Thus, for instance, in one it is found decidedly acid; in another, neutral; and in another exhibiting a marked alkaline reaction. The acid condition of the saliva enables it readily to act upon the teeth, and it is therefore well to determine the condition of the secretion by introducing a piece of turmeric or litmus paper in the mouth during the continuance of a series of dental operations. It has also been stated that the saliva is acid in inflammatory affections, and the opposite in nervous derangements of the system.

Dr. Tees regarded the saliva as exerting a mechanical action upon articles of food, but thought it not entirely separated from some chemical influence. He had often noticed the effect produced upon amylaceous substances placed in the mouth. He thought that fluid substances, if taken slowly, were much more agreeable to the taste. This he considered to be especially the case with malt liquors, where the first taste was unpalatable. If the lips be applied to the mouth of the bottle, and the fluid be allowed to pass but slowly, the taste is much enhanced. This he regarded as due to the greater admixture of the fluid with the salivary secretion.

Dr. Hoffner said that the flow of saliva during the performance of dental operations was, in some cases, a source of great annoyance, espe-

cially in operating upon the lower teeth. Many devices had been resorted to, in order to prevent the filling from becoming wet during its introduction into the tooth, such as the placing of napkins of different shapes and sizes in the mouth to absorb the fluid secreted. But sometimes all means proved inadequate, and the operator was compelled to resort to what is technically termed the "submarine" operation. An instrument in use by some practitioners was that which he held in his hand, known as Arthur's saliva pump. The philosophy of the action of this instrument was very simple. If the India-rubber ball at one end of the bent glass rod be pressed, a partial vacuum was created on the inside. The mouth of the tube is then placed below the surface of the saliva, and the ball allowed to expand, when the exterior air forces the fluid into the bulbous expansion about the middle of the glass tube. This instrument is an effectual one,—its greatest objection being the liability to contamination from the secretions of the mouth by the frequent use to which it must be subjected. He also stated that it was a well-recognized fact, that various medical agents had the effect of increasing the secretive action of certain glandular structures. Thus diuretics influenced the kidneys; cathartics, the mucous glands of the intestines; diaphoretics, the sudoriferous glands; sialagogues, the salivary organs, etc. Among these latter, no agent was more potent than mercury, and its injudicious use had been the cause of much evil. A case had lately come under his notice at the Philadelphia Hospital. An old man had been subjected to a mercurial treatment, and subsequent exposure had developed a congested and inflammatory condition of the mucous lining of the mouth, involving the salivary glands. The flow of saliva was enormous. The face, especially about the region of the parotid, was much swollen and indurated; but, under a stimulating treatment, combined with disinfectant mouth-washes to arrest the fetor of the breath, the patient had been sustained. The gums had gradually receded from the necks of the teeth, which were already quite loose, and could easily have been removed. The face, over the parotid, had been painted with tincture of iodine, and the result was a lessening of the induration by the stimulation afforded the absorbents. In a later conversation with Dr. Agnew, at present in charge of the hospital, he said that he had noticed but little, if any, further improvement, and feared that the bones of the jaw were beginning to necrose. He regarded it as the worst case of salivation that had come under his notice.

Cases such as this, though less severe, may at times present themselves to the notice of the dental practitioner, and it is well that he should be acquainted with their peculiarities and learn to distinguish them, and in such a case one of the best diagnostic signs is the peculiar odor which the mercury imparts to the breath.

Dr. Flagg said that, in connection with a profuse flow of saliva, he had successfully taken advantage of the fact that glandular parenchyma, in

common with other tissue possessed of irritability, would respond to the stimulation of mental emotion or even specific medication for only a certain length of time, yielding only a certain amount of its peculiar product. Acting upon this knowledge, he always prepared for superabundant saliva cases by a comparatively unlimited supply of napkins, which he introduced consecutively as fast as they became even tolerably moistened. At first the changes had to be made with great frequency—perhaps two or three per minute; but soon the flow would diminish, and in five or ten minutes he could usually operate for quite a satisfactory length of time without the necessity of changing, and he not unfrequently effectually overcame this most annoying obstacle to satisfactory manipulation.

Dr. McQuillen said that the flow of saliva was sometimes very troublesome in dental operations. A simple method which he adopted, when the tooth was in the upper jaw, was to cover the tooth with a napkin, and, inclining the head of the patient over the spittoon, allow the saliva to *flow* from the mouth. Ordinarily, when operating, he used small pieces of muslin, which he placed under the tongue and between the cheek and gum, renewing them as fast as they became saturated. Sometimes he had found all precautions to fail, and had been compelled to perform the operation below the surface of the saliva.

He held that practitioners should take time in the performance of their operations, as the great desideratum was to perform an operation well rather than quickly.

At the termination of the discussion, Dr. Moffatt, of Harrisburg, was invited to describe his method of constructing his non-sectional block-work, which he did to the satisfaction of those present. As our report could give but a general idea of it, we defer the description.

Adjourned.

BROOKLYN DENTAL ASSOCIATION.

October 19, 1864.

BY DR. W. C. HORNE.

Subject—AMALGAM PLUGS.

Dr. John Allen referred to Lawrence's Amalgam, gave it some praise, and stated that, by an ingenious contrivance of Dr. Lawrence, the amount of expansion in different amalgam plugs could be accurately measured, showing a less degree of expansion in Dr. L.'s than in any other plugs he (Dr. A.) had seen tested.

Dr. Clowes stated that he had used amalgam over twenty years, even when, in the American Dental Association, the test question was, "Do you use amalgam?" Under the tuition of Dr. Harris, at Baltimore, he was taught to reject amalgam *in toto*; but, with all respect to him, he thought he inculcated false doctrine in this particular. He had been

drawn to investigate the subject by an amalgam plug which he found in the mouth of a lady from New Orleans. The tooth had been aching, and was wiped out—not excavated—and the amalgam pressed in with the finger. For a few days it was tender; but ever after it had been serviceable. He thought if this case, so carelessly treated, has done so well, what may not better treatment secure? From that day to this he had worked for the improvement of the amalgam plug. Many have an impression that it is bad, and so slight it; but he thought there was something providential in it. Teeth are to be saved, and it is well that we have some means of doing the work without the expense of gold plugs.

Dr. Hurd remarked that when Dr. Clowes was induced to come into this Society, he thought we had converted an old foggy; but he confessed to being a little old foggyish himself. He had never used this amalgam plug till he heard Dr. Clowes advocate it, and he believed now there were many teeth that could be saved in no other way. We are too much inclined to follow our leaders, like sheep; we have theories about things, and feel it necessary to stick to them; we have different ways of using gold, and each thinks his way the best. One pounds, and another pushes; or one uses rolls, and another strips. What we need is common sense. Some men's amalgam is good universally, and some men's gold is bad universally; the difference lies in the preparation of the tooth and in the plug. Because the very best plugs can be made with gold, we should not throw away all other materials. He had thought the use of amalgam had caused pytalism; but a case of destruction of the lower jaw had been detailed to this body where the stopping used in the teeth was Wood's metal.

Dr. Fitch had had results in the use of amalgam in his own practice which were quite satisfactory, and had saved the teeth from decomposition. He was convinced that amalgam could be so prepared and manipulated, with a thorough preparation of the cavity, as to preserve a tooth for many years. It was only the slovenly manner of preparing and using the material that he condemned in unqualified terms. He used this material only for frail teeth as a general rule; sometimes employed it for other teeth, in order that he might bring his operations within the reach of a class of patients. At a former period he had supposed that mechanical union only was obtained in the mixture; but, from microscopical examination, found that crystallization was uniform throughout the mass—no free mercury was perceptible. Discoloration of a tooth was due to the fact that the oxides of the metals employed were present. The amalgam mass should be thoroughly washed at the time of preparing it for use; otherwise the secretions of the mouth would dissolve the oxides, rendering the plug porous and coloring the tooth structure, more or less, from their absorption. Chloride of sodium serves to mechanically divide

minutely the materials, so that the different constituents are brought into more intimate connection. He did not believe that ptyalism was ever caused by amalgam stoppings, although some persons were impressible by very small doses of mercury. A dentist should be eclectic in all his practice; yet he should not be moved from pursuing his given course (however much at variance with acknowledged authority) when convinced of its superiority.

Dr. Clowes wanted the young men to beware of the opinions of eminent practitioners on amalgam. It was a saying of Dr. C. C. Allen, "If my life and fortune depended on the salvation of a tooth, I should use amalgam;" and this was said when the great men in the profession denounced it. He (Dr. C.) was just as careful in preparing a cavity for a cement plug as for gold; and while no one could appreciate the beauty and excellence of a plug of solid gold, such as can now be made, more than he did, he was yet thankful that a way of salvation remained for the teeth of those who could not afford the more expensive treatment.

November 2, 1864.

Subject—PERIDONTAL INFLAMMATION.

Dr. Mills read a paper on this subject, from which we draw the following: *First.* What is meant by the terms *peridental* and *periosteum*? *Peri* means around; *osteo*, bone; *periosteum*, around the bone. *Dentium*, pertaining to the teeth. Inflammation means febrile heat. Thus we have the meaning of peridental inflammation; it is a fever heat of the membranous envelope of the fangs of the teeth. This membrane is tough, fibrous, and highly vascular; that is, full of vessels passing into minute orifices, which cover the entire surface of the bone. As the bones become older, this membrane loses a degree of its vascularity, and becomes thinner. It also serves as a nest for the ramification or division of the vessels previous to their distribution in the bones. When the bone is denuded of this membrane, which happens from various causes, exfoliation or necrosis takes place. *Second.* What is the cause of peridental inflammation? In cases in his own practice he had found that it originated mostly from attempts to destroy pulps by devitalizing medicines; also by filling over dead pulps not removed. He had found that great danger exists in overtreatment of low-toned teeth, particularly those of children. Once it took him (or he thought it did) from seven to ten days to destroy a pulp, making an application of arsenic with morphia and creosote each day, and each day hooking at the delicate structure with a savage force—sometimes not satisfied with all the pulp the tooth contained, but carrying his researches beyond the apex of the fang. From such practice he lost nearly all the devitalized teeth he attempted to save; cause, peridental inflammation, and then alveolar abscess—principally bad

practice. The remedy for such cases was specific—immediate extraction. He meets with much less of this trouble now, his present practice being to make one application of arsenious paste, which is left in the tooth from one to three weeks; this completely destroys the pulp. It is easily removed at the expiration of the time, and the tooth filled at one sitting without any inconvenience to the patient, with rare exceptions, and these confined to low-toned teeth. *Third.* What is the cure for peridental inflammation? The first necessity is to get full control of the case, without which one will work against hope. In its incipient stages he had arrested the inflammation by producing nausea, and by a speedy movement of the bowels. A patient of a strong bilious temperament will find most speedy relief from this treatment; while one of scrofulous inclination will not. In one case a rapid change was made by the use of Seidlitz powders. But he fully believed from his own experience that, in eight cases out of ten, the simple application of ice will effect a cure. Apply shaved ice in a thin piece of muslin to the diseased parts, taking care not to touch the tooth; let it remain a few moments, then apply again, and so alternate. Believed this to be the easiest and best remedy. He had used another with success: two parts chloroform with one part camphor dissolved in it. It is cooling at first, scattering, producing, after a few applications, an external irritation, and effecting a cure. Had also used leeches with a good deal of inconvenience, and some prejudice on the part of the patient. Whatever we do with these cases of peridental inflammation must be done in earnest and in season; delays do not necessarily bring defeat, but cause much suffering and trouble to both patient and dentist.

Dr. A. C. Hawes had used ice with the addition of salt, and found it excellent.

Dr. Clowes had done well in treating these cases until he began to use camphorette creosote; but he found that, in destroying the peculiar smell of the creosote, he had also changed its character, so that it no longer allayed pain and inflammation, but made them far more violent. It had occasioned him much trouble, and as soon as he found the cause he discontinued its use.

Dr. Francis, in incipient cases of peridental inflammation, applied tincture of iodine once or twice a day. If this injured the gums, he treated them with powdered borax.

Dr. Marvin had suffered severely from this trouble in one of his own teeth; but, on the outer wall of the alveolus being cut through, a jet of gas seemed to escape, and he was immediately relieved. Treatment for a few days with creosote ensued; after which he experienced no pain whatever.

Dr. Hawes, in one case, merely drilled through the alveolus and inserted cotton wet with creosote, which worked a perfect cure.

Dr. Marvin having filled a lower molar with amalgam, it became painful. He then drilled down by the anterior side of the tooth and dressed with creosote; after which the pain subsided.

WABASH VALLEY DENTAL ASSOCIATION.

THE second semi-annual session convened in Crawfordsville, Ind., October 25th, 1864.

Dr. A. M. Moore, President, in the chair.

The following gentlemen were elected members of the Society: Drs. Knapp, Gailey, Manlove, Yolten, and Clark.

Messrs. Field and Lind were elected Honorary Members.

The next business in order, being a discussion of the subject of Alveolar Abscess, was taken up, and an interesting and spirited debate followed.

"Compound Fillings" was the next subject of discussion, and elicited a good deal of interest.

"Separating Teeth and Professional Etiquette" were discussed at considerable length.

The following gentlemen were appointed to read dissertations at next meeting: Drs. Hurd, Winslow, and Knapp.

Adjourned to meet in the City of Fort Wayne, on the second day of May, 1865.

Taking into consideration that our Society has scarcely completed its organization, I feel a delicacy in reporting the proceedings in detail; but claiming to have good material to carry out the work we have undertaken, I feel confident in saying that the transactions of this Society will be an honor to the dental profession in the West.

W. A. PIFER, *Secretary.*

EDITORIAL.

SENSITIVE DENTINE—ARSENIC, AND THE TREATMENT OF THE DENTAL PULP.

I SUPPOSED I had written enough long ago, on the treatment of sensitive dentine, not to require me to say any more about it; but daily experience proves that it must be a "thrice-told tale." Not only does daily experience in practice prove this, but the writings of many intelligent operators. Either the minds of the mass of dentists do not regard it a requirement to palliate pain, or they are unsuccessful in their attempts to do so, for want of a proper understanding of the subject. I do not make this as a charge against any one, but there must be some explanation somewhere that is not understood. To make

this matter plain, I will state a case. A young lady had been under the hands of a popular dentist; had her teeth operated upon; some of them plugged three and four times; the plugs fell out in a few weeks or months; her sufferings were so great that she wept all the time the teeth were being plugged, and her father held her hands, and cheered her at every sitting, as he regarded it so important that her teeth should be preserved. At last she said, "Father, I cannot bear this any longer; I have nerved myself over and again to the task, but my nerves are so shattered that I cannot go through with an operation again; it is impossible." Well, the further treatment is dropped for a year or more. Finally, the patient is brought to me. A friend told her that I plugged teeth like hers without pain. Her father brought her to me, and said: "If these teeth can be plugged without pain, I would like it done; but if it is to be by much suffering, she cannot submit to it." I said, I will try. All the superior incisors, canines, and bicuspid were decayed. Some few plugs were still in, but very imperfect. I found the teeth exquisitely sensitive, and a kind of leather-like or tough decay; the patient a highly nervo-sanguine temperament. I applied the dry-powdered arsenious acid to a superficial cavity, to test the manner in which the arsenic would act, the patient to call next day. The part was less sensitive, but the decay could not be removed. I applied the same preparation again; the next day the decay could be removed, and the cavity shaped to receive a plug. The cavities in all these teeth were not so formed by the decay that, when it only was removed, the cavities would hold plugs well; so that some sound dentine had to be removed to properly shape them. I then commenced to treat two at a time, and I found that, when there was a good deal of decay in a cavity, I had to apply the arsenic from five to ten times before the decay could be removed and the cavities properly shaped. I plugged about twenty cavities for this patient; and, with all the arsenic that was applied, only one had sufficient to penetrate to the pulp cavity, which gave pain about one year after. Five years have elapsed, and no other one of the number has given pain or become discolored, and the teeth are in a good state of preservation up to this time. The pulp that became inflamed was destroyed, and the tooth refilled, and is still good, and has not given pain since. I have been obliged to take two sisters and the mother, who were similar cases; but the mother had lost ten of her upper teeth, simply because she could not bear the teeth to be properly prepared for plugging. The children all inherit the mother's nervo-sanguine temperament. In the majority of cases I use the dry arsenic on a small pellet of cotton, or place it in the cavity in powder, and place the cotton over it; if the part is not too sensitive, I place yellow beeswax over it. I very seldom use the paste for sensitive dentine, because I fancy that the creosote permeates the decay and dentine, but without sufficient arsenic to kill the part as it pene-

trates the tooth; and consequently it only acts as an irritant, and makes the tooth more sensitive. If such results do take place, I wait until the effect of the arsenic passes off before I apply again; and then I use the pure arsenic, and allow it to remain only over night. J. D. W.

(To be continued.)

ERRATUM.

IN the December number of the DENTAL COSMOS, in a "selected article" from the October number of the *Dental Register of the West*, on Alveolar Dental Periostitis, by Henry S. Chase, M.D., a typographical error in the *Dental Register* escaped detection, and was reprinted,—the word *chorea* being made *cholera*, a very different morbid condition from that which the author intended to designate.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

THE PEOPLE'S DENTAL JOURNAL—OCTOBER.

"THE DUTIES OF PARENTS.—The great and paramount duty of parents is to give their offspring 'a sound mind in a sound body.' Those who are conscious that they are unable to do this have no right to become parents. This is a subject that deserves the candid and conscientious meditation of every one. It is a subject upon which a volume might be written, and read with profit by the whole community; but I propose only to make a few remarks on the theme, so far as it relates to the TEETH.

"The teeth of children are not only influenced in their organization by the constitution of parents, but by the mother's daily mode of living during *embryo* life and nursing. The most perfect and robust health should be the mother's aim during the whole period. And such food should be partaken of by her as not only seems to agree with this condition, but such food should be used as will the most perfectly develop the best quality of teeth in the child. There is rarely ever a lack of *animal* substance in the teeth; but in these days they are almost universally defective in phosphate of lime, that part which constitutes the bulk and gives *hardness* to the enamel.

"Now it should be distinctly understood that bread made of flour, and all kinds of pastry and cake, are entirely unfit for the proper development and growth of the teeth, and are absolutely deficient in the elements which give the teeth their peculiar hardness and durability.

"What mother, knowing these facts, will voluntarily or carelessly starve the little one dependent on it for nourishment, and condemn it to the misery which those suffer having decayed teeth?

"Mother, have you ever endured the horrors of toothache, or been subjected to the painful operations of the dentist required for their preservation? Would you save your darling from sufferings? Let your food be, then, during *gestation* and nursing, of such a character as will retain all its original elements as nature produced it. Food made of the flour of wheat, rye, corn, and other grains is entirely unfit. The same must be

said of starch, tapioca, arrow-root, and sago. Graham and corn bread, warm cakes of all kinds of grain, *ground to meal* and only divested of the coarsest bran, beans, peas, potatoes, and all garden roots, fruits of all kinds, beef, mutton, eggs, (*no pork*,) wild game, chickens, fish, milk, lager beer, and Scotch ale are a variety which none should find fault with, and are found on trial to be proper and desirable.

"Parents OWE THEIR CHILDREN A GOOD SET OF TEETH, and they are more *responsible* for their soundness than for their education and morals. The teeth of children are perfectly under the control of parents. Parents, do your duty; let the food of your children, as they grow to maturity, be of the character already described, avoiding tea, coffee, and spirituous liquors. As early as three years of age, learn them the use of a tooth-brush, and *enforce cleanliness* of these organs. Not later than five years of age, take your child to a capable and conscientious dentist and have its teeth examined, and thereafter make periodical visits not less than twice each year for the same purpose. Put your child under his professional care, and let him understand that you expect every necessary operation to be performed, and such advice given as will insure that child a *regular and well-preserved set* of NATURAL TEETH.

"Some may object to the *expense*; but have you any more right to deny your children the blessing of good teeth than you have of good health? If you are able to clothe them *comfortably* and give them sufficient food, the excuse of *expense* is utterly void. What, besides a moral and intellectual education, would a grown-up son or daughter be more thankful for than a sound or well-preserved set of teeth? If you have *anything* to give your children besides plain food and clothing, do not let them lament that you refused or neglected in their youth to give them sound and well-preserved dental organs.

"H. S. CHASE, M.D.

"INDEPENDENCE, IOWA."

"IMPORTANCE OF PRESERVING THE DECIDUOUS OR FIRST TEETH. By C. P. FITCH, M.D.—It often happens that parents and guardians of children do not fully realize the value, neither the importance of preserving the first teeth until the time allotted by nature for their removal, which she many times accomplishes by the slow process of loosening and throwing from the jaw. There is also often a very serious mistake made in reference to the six-year molar teeth, regarding them of little consequence, from the fact that it is erroneously supposed they belong to the first set, and will soon be replaced by others. Thus these last-mentioned teeth are permitted to decay from sheer neglect, based upon either an indifference to their importance or ignorance of their true value.

"Now, the temporary teeth have as much a purpose to subserve as the permanent ones, and their preservation up to a certain period becomes a matter of the highest moment. As this article is more particularly intended to benefit the children through the class of persons first alluded to, I hope it will accomplish its mission through the columns of the People's Dental Journal, which is, I believe, designed to educate the people.

"A consideration of a few practical points will, I trust, present this subject in its true light. It may be well to state in the outset that there are twenty deciduous or first teeth, ten in either jaw—no more, no less. The process of their eruption or cutting, as it is familiarly termed, is completed, with healthy children, between the ages of three and four; sometimes a few months earlier than the first period named, and then

again a few months later than the last period mentioned. The first set of teeth embrace eight molar or double teeth, two on either side, in the upper and under mouth. These first molar teeth when shed are replaced by smaller ones, called bicuspid. The very moment a child has additions to the number I have mentioned, as constituting the full complement of first teeth, either by their duplication, which is accomplished by the shedding of the first set, or by the appearance of new ones posterior to the first teeth, that moment the child has teeth which belong to the second or permanent set.

"The double teeth, which make their appearance in the mouth at or about the sixth year, belong to the permanent set, and are called the six-year molar teeth. It will be seen, from a moment's reflection, that these six-year molar teeth, which number four in all, one on either side above and below, are of the highest importance, inasmuch as they belong to the permanent teeth, and their presence is directly concerned in the harmonious development of the jaw-bones, thereby securing an adult or manly instead of a baby or youthful expression to the features.

"But why preserve the first teeth? Why is it not just as well to let them decay, as they are soon to be supplemented by others which will prove more permanent in their character?

"I answer, if these teeth are removed prior to the time which nature determined, the development of the jaw will be arrested; and if the growth of the jaw is interfered with, there will not be sufficient room in the proper dental circle of the arch for the second set of teeth; hence an irregular, permanent denture is the inevitable consequence.

"In this connection it may be well to note the time that the deciduous teeth naturally fall from the jaw, or should be expected to do so. This occurs, with the four front teeth, between the ages of seven and nine; with the molars, between the ninth and twelfth years; and with the eye teeth, from ten to fourteen.

"The vigor and precociousness of the child will determine very much the time for the shedding of these teeth. A very good general rule to be observed in reference to any of the deciduous teeth, is that they should never be removed until they get loose. There are instances where it would not be well to wait for this result; but any intelligent dentist will solve the question at once by seeing the child. In the process of growth of the second teeth, the roots of the first teeth are absorbed, and the teeth consequently loosen about the time the second teeth make their appearance. But it is sometimes the case, from one cause or another, either for the want of room in the jaw or from some peculiar conformation of the parts, or on account of a freak of nature attending facial development, that the second teeth make their appearance outside of their true position. Whenever this occurs to any extent, the roots of the first teeth are not absorbed, and consequently these teeth do not become loose. But it always will be safe to remove them whenever they become loose, and on the appearance of the second teeth, which are intended to take their place. This, as a general thing, will prove safe practice.

"Another reason for the preservation of the first teeth until the conditions just alluded to are observed, is that it saves the child from much pain and suffering. If the pulp of the first teeth are prematurely exposed from the tooth's decomposition, the patient is many times subjected to great torture and protracted suffering. Now this is wholly unnecessary. By timely filling these teeth, this sad result will be entirely prevented.

"Another reason for their preservation in a healthy condition : The decay of the first teeth, if it is attended with much pain, (and it generally is after the exposure of the pulp or nerve,) necessarily produces great derangement of the nervous force, which force presides over the growth of the body. Now, in order to the harmonious and proper development of the different structures composing the body, it is quite essential that the equilibrium or harmonious action of this force be strictly maintained ; especially is this necessary during this very active formative period. No doubt in many instances imperfect developed bodies and frail physical constitutions are the direct results of this disturbance or perversion of the nervous force, arising from pain experienced in connection with or caused from a diseased condition of the first teeth.

"Another reason for their preservation : The body at this period is growing rapidly, and makes imperious demands for the proper nutrient supply. The office of the teeth is to comminute or masticate the food. If this is not properly secured, extra labor is thrown upon the stomach, often engendering much gastric derangement. Thus the food is but partially digested, and the subsequent act of assimilation or the appropriation of this food is materially interfered with. The result of all this is the partial starvation of the body ; not a sufficient supply of nutrition is provided, at least for promoting and securing healthy structural development.

"Another reason : This is a period when the child learns to talk. All children naturally have voice ; but they must be taught before they can make articulate sounds or speech. This is a mechanical act. The presence of these teeth in the mouth in a healthy condition is quite necessary, in order to the attainment of the most perfect results in this direction. What parent's heart does not pulsate with joyful emotions at the first intelligent prattling of their darling ! Would you secure early perfection of oral language, take care of the first teeth of your children.

"Many reflections of a practical nature might be deduced from the above considerations ; but, perhaps, sufficient has been said to subserve the purpose I had in view in penning this article, viz., calling the attention of parents and guardians to the great importance of preserving, in a healthy condition, the first or deciduous teeth of their children, or of those committed to their care.

"NEW YORK, May 26, 1864."

"**LIFE IN OFFICES AND COUNTING-ROOMS.** By E. ANDREWS, M.D., Professor of Surgery in Chicago Medical College.—A considerable number of men die, or are disabled every year in Chicago, by the deleterious effects of office life. There is an evil here which the mercantile classes ought to be warned of, and induced to correct, and the more earnestly do I desire to point it out, because the victims of it are generally the most industrious and thorough portion of our merchants and their office clerks. The evil complained of is twofold : one part consisting of excessive and continuous mental labor, resulting in brain exhaustion ; and the other, of inhaling foul confined office air, resulting in blood poisoning, and consequent risk of death in a multitude of modes.

"Brain exhaustion, in its pure form, is more frequently seen in the proprietor or head manager of an establishment than in the office clerks. This results from the heavy personal interests he has at stake, causing him to become totally absorbed in his enterprise, and goading him on to such excessive, unremitting toil at the desk as ultimately breaks him

down. The symptoms in these cases are so clear that the physician can tell without inquiry that the brain has been overworked. The disease is commonly called nervous fever. The patient is mostly confined to his bed, is excessively restless and worn, sleeps badly, tongue not very foul, but the pulse is feeble and rapid. The most striking symptom, however, is a whining peevishness, a sort of childish, fretful, low spirits, 'like a sick girl,' as the poet has it, and which is altogether foreign to the man's usual manner,—in fact bordering on temporary insanity. Some of these patients are past help from the outset, and some die, but the majority make a slow and tedious recovery.

"It is worthy of notice that this disease, though produced by excessive mental effort, yet seldom attacks any except those who work in close offices. Men who are engaged out of doors, or in perfectly fresh air, seldom get it, however severely and continuously they may exercise their minds.

"The second evil is blood poisoning from foul air. A merchant hires a store on South Water Street, where it has the full benefit of the fragrance of Chicago River to begin with. Then it is twenty-five feet wide and one hundred and fifty feet long. It has just two openings for ventilation, viz., the front door, opening on a crowded street, and the back door, opening on a narrow, offensive, dirty alley. It is fair to presume two things: 1st, that no perfectly pure air ever gets into the store at all; 2d, that what does come in only gets a lazy, imperfect circulation among the boxes, bales, and barrels. When I was in the army I saw several such stores taken for hospitals, with the invariable result that the patients died by scores from the effects of foul air. It was found impossible to ventilate sufficiently such long apartments, with openings only at the ends. In this confined air, therefore, the clerks, porters, and customers breathe and perspire all day long, adding new poison to air which was none too good in the beginning. But the worst is yet to be told. The proprietor of this inclosure of foul air does not deem the general atmosphere of the store even yet quite bad enough for his own personal use. He therefore cribs off a small counting-room, with glass partitions, in such a situation that it only gets air from the interior of the store. In this little room he locates himself, his partners, his book-keeper, his corresponding clerk, etc. If there are any remaining whiffs of air in the room fit to breathe, they are all used up by ten o'clock in the morning. These are the merchants who have nervous fever. These are the young, ambitious, hard-working clerks, and book-keepers, who grow pale, who have dyspepsia, and cannot be cured by the doctor, who have typhoid fever, and are laid up six months, who fall into consumption, who have besides forty troubles, and cannot get cured.

"Such men come to me, who actually work ten hours a day in a poisoned atmosphere, and then take their books home to work at them evenings. I say to such persons, 'I shall not try to cure you now; you are going the sure road to death, and if I prop you up a little longer, to enable you to go on in the same course, it will only make the final result more sure and irremediable. The quicker your health breaks down, and obliges you to stop such a course of existence, the better chance you will have of final recovery.'

"I know not what mechanical arrangements would be best adapted to ventilate our stores and offices, but I have seen numerous establishments where the loss of time and efficiency by the proprietor and employees would every year almost pay for a fan-blower and a steam-engine to propel it."

"GONE TO NEW YORK.—DR. E. A. BOGUE, who has been practicing Dentistry in Chicago for the last nine years, has gone to New York, to practice his profession. He enters the office of Dr. Norman W. Kingsley, who, besides enjoying a commendable reputation with the profession as a practitioner, has of late become noted as the inventor of a new and the most useful artificial palate ever before made.

"Just before leaving for New York, Dr. Bogue inserted one of these palates for a young man of this city, and sent him to the Chicago editor of this journal, so that he could see it in practical operation in the mouth. It was not only a good fit, and worn with comfort, but the speech was much improved, and the case in every way answered well the purpose for which it was intended. Dr. Bogue leaves behind him many friends and patients, who part with him with regret, and hope for his success in his new home."

BRITISH JOURNAL OF DENTAL SCIENCE—NOVEMBER.

"A CASE OF INJURIOUS RESULTS FROM WEARING PINK VULCANITE. By GEO. LYDDON, L.D.S.—Several cases have come to my knowledge where the dark-colored dental rubbers have proved injurious in the mouth. One such case occurred at our County Hospital, at Reading, last year, and was published at the time, I believe, in the *Medical Times*: the rubber used, however, I should judge (from my knowledge of the case) to have been of the most inferior description. I am not acquainted with any cases where injurious symptoms have resulted from wearing the pink rubbers, and was surprised to meet with an instance in our own practice. A young lady having applied to us by the advice of an eminent medical practitioner, we supplied her with a set of teeth; the upper we mounted on gold in the usual way; the lower, on best pink vulcanite, the plate passing behind the front teeth, which were standing. The result was speedily evidenced by profuse flow of saliva, a coppery metallic taste, followed by very decided ulceration round the front lower teeth. The flow of saliva and other symptoms subsided with the absence of the piece, and their severity always increased with its resumption. The patient was of extremely delicate constitution; but otherwise in good health at the time. She was not then, nor had she ever been, taking mercury in any way as a medicine. The pink rubbers, undoubtedly, derive their color from a very small proportion of red sulphuret of mercury, the darker preparations containing considerably more. Mercury in this form is very nearly indissoluble in the fluids of the mouth, and is, consequently, inert in good constitutions; but, from our experience in this case, we have determined to exclude it as a dental substitute in all cases where there are any symptoms of a tendency to disease of the liver, and from pale, anæmic constitutions generally.

"I trust the description of this case may prevent other practitioners from meeting with a similar disappointment and the expense of providing a different piece without remuneration, a course which we felt bound to adopt."

"ON A NEW GUTTA-PERCHA STOPPING. By GEORGE F. RODWELL, F.C.S.—In the early part of 1863, Mr. Thomas Underwood requested me to endeavor to produce a gutta-percha stopping more durable and less liable 'to cup' than Hill's stopping. I prepared a number of stoppings, the constituents of which were the oxides, carbonates, and sulphates of various bodies, which it was thought would produce a hard durable material of close texture.

"Among these different stoppings, there was one which was decidedly harder than Hill's, and which, on being used for stopping a decayed tooth, was found to wear well and to cup but slightly. Mr. Underwood brought this stopping before the notice of the members of the Odontological Society in May, 1863; since which time he has constantly used it, and has found it to be very durable. Inasmuch as it has now been fairly tested, and has been found to possess certain advantages over other stoppings of the kind, I conceive it may be of interest to the readers of this journal to have an account of its composition and preparation.

"The stopping contains in 100 parts—

"Gutta-percha	30·3
Carbonate of Baryta	30·3
Oxide of Zinc	30·3
Precipitated Silica	9·1

"The gutta-percha (which should be the hard, brown variety, sold in the form of cords, half an inch in diameter) is cut into small pieces, and dissolved by the aid of gentle heat in chloroform. When perfectly dissolved, an intimate mixture of the other constituents, previously reduced to the finest possible powder, is added in small quantities at a time, the mixture being stirred and the heat continued until all the powder has been added, when the temperature is gradually raised until it is found by weighing that nearly all the chloroform has evaporated. The pasty mass is then removed from the vessel in which the evaporation has been carried on, and is kneaded into a lump by the hand; it is next placed in a hot-air bath at a temperature of about 110° C., and must be weighed, from time to time, until it is found that the whole of the chloroform has evaporated; the mass is then at once removed to a steel mould and submitted to pressure, in order to fill up any cavities which may have been produced by the chloroform vapor during its escape. When cold, the stopping is removed from the mould, and is ready for immediate use.

"It is needless for me to remark that the stopping must be prepared in a room through which a strong current of air passes, and that great care must be taken to inhale as little of the chloroform as possible. The heat must be carefully regulated during the whole operation, otherwise the mixture becomes lumpy and perfectly useless. I subjoin a note received from Mr. Underwood on the subject.

"23 GREAT MARLBOROUGH STREET, LONDON,

"November 22, 1864.

"MY DEAR SIR: In reply to your note, I can truly say that my good opinion of your stopping has been greatly strengthened since I introduced it to the notice of the Odontological Society at its meeting in May, 1863.

"My experience of it since then has been considerable, and I have found it so useful, in cases of teeth too tender to bear foil plugs, that on no account would I be without it.

"In hardness and durability it far surpasses any other preparation of the like nature I have met with.

"Care should be taken to heat it very gradually; it should be introduced into the cavity of the tooth as nearly as possible at the natural temperature of the mouth, and after an hour or so it may be used in mastication. Believe me, my dear sir,

"Very faithfully yours,

"THOMAS UNDERWOOD.

"7 GOWER STREET, BEDFORD SQUARE, W. C.,

"November 9, 1864."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"On Vitality. By the REV. H. H. HIGGINS, M.A.—Of the various questions which the physiologist is called upon to consider, in the course of his researches into the phenomena exhibited by organized beings, none, perhaps, possesses greater interest than the one discussed in this short but able pamphlet by Mr. Higgins. Is there, or is there not, a force resident in those bodies which, from their special manifestations, we term organisms or living beings, over and above those chemico-physical forces the nature and mode of action of which we recognize and especially study in inorganic bodies? This force has had various terms applied to it by those who affirm its existence, *e.g.* vital force, germ force, vital principle, or vitality, as in the pamphlet before us.

"The older physiologists, we may say, universally believed in such a specific organic force, and sought in it an explanation of most of the phenomena to the investigation of which they applied themselves. But the more refined methods of inquiry adopted in recent years have proved that there is no need to presuppose the existence of a specific vital force acting in many of these processes, for they are perfectly explicable by the operation of well-known chemico-physical laws. For it must ever be kept in mind that an organism is a material body, and as such is subjected to the action of those forces which operate in and on matter, though these are undoubtedly modified and often rendered more complicated and difficult to recognize than in inorganic matter. Hence has arisen a physiological school, whose leading members are some of the most brilliant and distinguished of living German physiologists, who, from the results which they have obtained by applying to the investigation of organic processes the methods of chemico-physical research, have been led to deny altogether the existence of any specific vital force. But whilst readily conceding that the advocates for a special vital force have claimed too great a dominion for their favorite potentate, and that many of its supposed subjects are really under the governance of other powers, yet we are by no means inclined entirely to dethrone it. We agree with our author in believing that there is a series of phenomena manifested in organized bodies which cannot be explained by chemico-physical laws, and which is not capable of being recognized even by chemico-physical methods of research.

"The broad line of demarkation which separates things animate from things inanimate: the manifestation in the former of those processes which the physiologist distinguishes by the terms development, growth, and maintenance—processes which are exhibited by the simplest vegetable or animal cell as clearly as by the highest and most complicated organism, and which consist not in mere superficial accretions of new matter as in the formation of crystals, the highest of all inorganic forms and processes, but in minute internal molecular changes—points at once to the existence in the former of a specific determining power, no indication of which is met with in the latter.

"And if life were made up of forces similar to those which act in va-

rious ways both on organic and on inorganic matter, we might expect to find the transition from things inanimate to things animate the same in character with all other transactions in nature; the border-land would be occupied with semi-animate materials, and semi-mineral vegetables or animals, with instances of equivocal life and products of doubtful organization. Whereas from the highest to the very lowest organism, the phenomena of life are distinct and unquestionable.'

"There is a class of scientific observers—pseudo-scientific, we had almost written—who believe that, by passing electrical currents through solutions of albumen or other nitrogenized substances, they can produce in them nuclei, cells, or other well-defined organic forms; and that thus, by the operation of a well-known physical force on certain forms of matter, structures, for whose production the vitalist contends that a spécial force is necessary, may be generated. But it has never yet been shown that these oval or spherical cell-like forms produced in such solutions are capable of going through those processes of development, growth, and maintenance which are the characteristic phenomena of all living beings. Their morphological similarity has too hastily been assumed to be a proof of their teleological identity. As well might it be said that the arborescent appearance seen on the glass in our window-frames on a frosty winter's morning was the same thing as the trees and other plants whose form and method of branching it simulates.

"We have not space to follow Mr. Higgins through the remainder of his carefully reasoned argument that the vital principle is a thing *sui generis*; but, in order to give our readers some idea of its nature, we reproduce in this place his general summary:—

"'1st. The unparalleled hiatus which exists between things animate and things inanimate.

"'2d. The great dissimilarity between the properties of the imponderables and those of vitality.

"'3d. The difficulty arising from the hypothesis that the embryo of a living thing is developed only by agencies analogous with known forces.

"'4th. The permanence of form and structure observable during many generations of the same species.

"'5th. The absence of any indications as to what becomes of the vital principle at death.

"'6th. The periodicity of life.'"—(*Quarterly Jour. of Science.*)

"*Metamorphoses of Man and the Lower Animals.* By A. DE QUATREFAGES. Translated by Henry Lawson, M.D. (Hardwicke.)—There cannot be a more interesting or a more worthy subject for a naturalist than the consideration of those changes which animals undergo between their first generation and their maturity. To call any comprehensive work on such a topic a 'popular' one, is, however, simply to apply a 'popular' misnomer; for the subject involves so many technicalities, so much knowledge of the most elaborate and difficult investigations, that none but highly and specially educated readers could, at the present time, estimate the value of, or even understand, the evidences upon which any connected series of arguments could be based. Although M. de Quatrefages has produced a treatise remarkably interesting, fluent and comprehensive, and possessing the merits—not at all common in ordinary 'popular' works—of having a beginning and an end, an argument and purpose both equally good and well combined, we doubt if, in the entire absence

of pictorial illustrations, half the facts given will be understood, or half the argument founded on them comprehended by any but accomplished naturalists. The book, indeed, is a good sketch-view of generally current opinions, put together with the praiseworthy object of endeavoring to elucidate a supposed harmonious correspondence between the seemingly multitudinous diversity of transmutations and metamorphoses exhibited in all classes of animated beings.

"An assertion that there exists any strict analogy between the development of a man and that of a butterfly, would be ordinarily thought an outrage upon common sense; yet with a full knowledge of the minute and wonderful investigations made by modern anatomists and embryologists, scarcely a naturalist of the present day would receive such an assertion with contempt or meet it with ridicule. To find out the exact comparisons and co-relationships between each phase in the development of insects through their ostensible metamorphoses,—the still more singular alternate generations of the *Medusæ*,—the early zoid conditions and subsequent transformations of the *Crustacea*,—the subdivisive multiplifications and production by budding common among the *Infusoria*,—the embryonic changes which take place in the egg-hatching of birds and the foetal transformations and living birth of mammals,—and to reduce all these, and even the propagation, flowering, and fructification of plants, to one common *fundamental* plan of development, might well be viewed by any but those who are versed in embryological researches, as a visionary attempt. And so it would be to any single worker. But the laborers in this field have not for many years been few nor far between. Even the older writers, from Harvey to Trembley and Leuwenhoek, contributed no mean materials toward that vast pile of facts and observations to which Siebold, Saars, Steenstrup, Küchenmeister, Leuckhart, Schwann, Kölliker, Van Beneden, Owen, Huxley, and Quatrefages himself, with many others not less eminent, have added such important contributions. It is, indeed, no mean labor to produce an intelligible summary of the main results of all these various materials; but in this respect M. de Quatrefages has been successful, and his book is suited for the perusal of those who wish to gain a general view of the present state of developmental anatomy and embryology.

"M. de Quatrefages believes in the antiquated notion of a vital force. We are not ready to say he is wrong, although the translator of his book does not hesitate to state his own dissent from this view, and declines to accede to it in a tone that makes one feel a century behind the age in not having quite abandoned it. Perhaps it may be but the lingering of a childish feeling—a phosphorescent glimmering in the mind of one of those many thousands of bright mental flashes that make the spring-time of human life so sunny, that causes us still fondly to cling to the sublime imagining that 'it is God that hath made us, and not we ourselves.' However, rightly or wrongly, M. de Quatrefages contends for the existence of a 'vital vortex,' and urges all his arguments to the final conclusion of the special individuality of every organized being, even though it may pass through generations in various metamorphoses. Like Harvey, he believes that every being originates in an egg, and he hurls against the heterogenists the dictum of Réaumur, *ex nihilo nihil*. The view he takes is, that there is a more or less definite series of transformations to be gone through by every living creature, from its primary generation to the attainment of maturity; that this maturity is made evident by the pos-

session of reproductive organs. These transformations may, to a greater or less number, take place within the body of the parent, or they may be more or less wholly or partially accomplished disconnectedly during growth, or by visible metamorphoses. Thus, in man, all the transformations are accomplished during the embryonic and the foetal stages, and the infant is born in nearly the condition of its highest state of existence. It has only to increase in bulk, and attain the state of puberty. But the butterfly is born as an egg, the germ of which, nourished by and increasing at the expense of the organizable material stored up in the yolk, becomes a caterpillar, which in its turn is transformed into a chrysalis, and this, again, by another metamorphosis, becomes the perfect insect. Neither the caterpillar nor the chrysalis can propagate themselves: the butterfly alone possesses generative organs. Each of these separate phases of existences are, then, but stages in the progress of development, and the individuality of the butterfly is as perfect through all these visible and extra-parental metamorphoses as the individuality of a man from his first conception to his birth and final maturity, and whose embryonic and foetal changes are all undergone unseen. What the membranous uterus and appended blood-vessels supply to the foetal mammal, the insect-larva has to obtain for itself by the exercise of its faculties. All animals, in fact, do undergo a variety of metamorphoses, and it remains to show whether these can really be correlated with each other as successive phases in one general plan, and why in some beings these changes take place in hidden depths, and in others are exposed to common observation. On the last points it may be, as the translator asserts as a great law, that 'those creatures whose ova—owing to an insufficient supply of nutritious contents, and an incapacity on the part of the mother to provide for their complete development within her own substance,—are rapidly hatched, give birth to imperfect offspring, which, in proceeding to their definite characters, undergo several alterations in structure and form, known as metamorphoses;' or the causes may be due to far sterner necessities, or even some people will think, in many cases, to those irrevocable fiat of a creative Power that have assigned to everything animate and inanimate its peculiar and special characters. There can be no doubt, as M. de Quatrefages assumes as an axiom, that the conversion of the rudimentary germ into a complete individual is the final end and object of those changes of form and proportions which are so variously exhibited in all classes of animals and vegetables; and indeed, does not the very multitudinousness of such changes in itself lead to the inference that they are but modifications of one general fundamental system, just as the varieties of plumage in birds and insects are all modifications of the same structural principles of a feather?

"But what would be difficult of correlation and comparison in insects and mammals, is comparatively easy compared to the correlating of those remarkable alternations of generations which take place among the *Talpæ* and *Medusæ*. Here metamorphosis does not affect individuals only, but operates on entire generations. Among the *Talpæ*, for example, a solitary mother produces only individuals connected in colonies; these again only produce solitary individuals. Hence the *Talpa* neither resembles its parents nor its offspring, but is 'exactly like its grand-parents and grand-offspring.' The umbrella-like jelly-fish floating in our summer seas are familiar to every one, but before the remarkable researches of Saar and Siebold, no one knew the strange story of the development of the *Me-*

dusæ. As an illustration, M. de Quatrefages selects the pretty *Aurelia*, rendered so famous and familiar by the descriptions of Ehrenberg. The aurelia deposits ova, which are converted into larvæ with oval bodies covered with vibratile cilia. For some time these swim about like infusoria; then they attach themselves to some solid body, and henceforth become fixed and stationary. By the secretion of a thick mucus, each spreads out into a wide disk; it swells, a stomach-cavity is formed, tentacles bud and grow, and the oval larva is gradually transformed into the polyp-like Scyphistoma. In this polypoid condition the medusa will propagate itself by buds and stolons, but by buds and stolons only; it has no generative organs. The beings thus produced perform the same functions as their parents, and themselves give rise to other generations. After a time each of these trumpet-shaped Scyphistomæ has become divided into plates,—has, so to speak, ‘cut itself up into slices,’ which ultimately are detached from each other and swim away in the water after the manner of acalephs. They are now medusoids, but not yet aurelias. At first flat, they gradually become bell-shaped, the stomach and mouth surrounded by tentacles appear, and the reproductive organs, male and female, are formed in separate individuals. Now, at first sight, there seems very little resemblance between these remarkable alternations of generations and the metamorphoses of insects, or the uterine development of man; and even still less, if that be possible, seems the relationship between these and the changes undergone by the cystic and other parasitic and intestinal worms. The cystic worms, for example, prefer the tissues, and are found in the midst of the muscles, or even in the brain. All these worms are nourished and even respire through the medium of the animal in whose flesh they are inclosed. Whence do they come? How do they propagate their race? Their germs, swallowed as food, by one animal, are developed in its tissues, to a certain degree, never beyond, and the creatures in the larval state thus attained, must perish or wait until the animal in whose substance they exist is itself made the food of an animal of another class. Then they proceed a stage further, and undergo a further change in the tissues of the new being to which they have thus strangely got access. Even here, when once the mind has grasped the idea of a connected plan of development, these serial changes, no matter how singularly brought about, are readily associated with it. The widest divergence from such a type-plan seems to be, where individuals of one generation multiply in numbers. But, however animalcules and corals, or larval beings, may divide or bud, it is but the multiplication of the same individual, and fission and gemmation have limits in the number of generations produced. There must be sooner or later a return to actual sexual connection. The more we know, the deeper we search; the more it becomes evident that for the primary origin and the permanent maintenance of a species, there must be, not only an ovum, but a fecundated ovum, and that although it be asserted that there is such a reality as parthenogenesis, or virgin-generation, the cases in which it is exhibited may surely be regarded as exceptional or requiring further elucidation.

“Now, the way M. de Quatrefages reconciles all these diversities of changes, is this. Transformation, metamorphosis, and geneagenesis, he regards as but three forms of one and the same phenomenon, bringing about the same final result. What is simple transformation in more perfect animals, is represented by metamorphoses more and more complex

as they occur lower and lower in the grades of life. Geneagenesis,—as M. de Quatrefages terms that class of remarkable phenomena in which the germs give rise not merely to a single individual, but to multitudes and even distinct generations, different alike in form, structure, and habits of life,—he nevertheless considers as controlled by the same laws, although in animals of this class we must embrace in one species the character of four or five beings whose forms and modes of life are quite dissimilar. ‘Metamorphosis,’ he says, ‘under the form of geneagenesis, not only complicates the idea which the mind conceives of any particular species, but it even extensively modifies our general and abstract notions of species. Up to this, we have understood by this word a succession of beings proceeding one from the other, and whose individuality is maintained, despite a number of more or less apparent changes. At the present, we must add to this that, in certain cases, the species is composed of perfectly distinct beings, which proceed one from another by a process of multiplication. To the idea of continuity of individuals, which forms the basis of all existing definitions, we must connect that of the succession of cycles. This is what was first understood by Chamisso, and was fully demonstrated by Steenstrup.’ Viewed in the light of multiplications of individuals in each marked stage in the progress of development toward a final maturity, those singular alternations of generations, as well as the multiplication of individuals in certain stages of their progress by fission or budding, become much more simple of understanding, much more easy of comprehension; but we do not see how they become arguments against the actual existence of such a phenomenon as the supposed spontaneous generation, although M. de Quatrefages endeavors to employ them to this end. The argument founded on these grounds may be valid against certain special experiments, but the very root and germ of the question of spontaneous generation must belong to quite a different field. Sooner or later, the heterogenists may be driven from every point but the one whether inorganic matter can, by any natural or artificial application of the physical forces, be made to assume a rudimentary form of vitality. That the higher forms even of infusoria cannot be generated without previously existing parents or germs, we are ready to admit ourselves convinced. But can the very lowest of the microscopic life-forms—can organic cells or germs be produced by the action of exciting causes from inorganic or so-called decomposing organic matter? is a question which it would be wise to refrain from answering at present with a denial. If the correctness of the doctrines of Darwin as to the transmutation of species be admissible, we ought to seek for one stage further and look for the natural transmutation of inorganic into organic, or rather of inanimate into animate matter.

“Altogether, M. de Quatrefages’ essay, though to men of science it may contain, as far as facts are concerned, little or nothing that is new, is well adapted to exert a powerful influence on those outside the select or learned circle wherever it is read, and can scarcely fail to incite practical students to take up the investigation of points useful and necessary in the final settlement of the important questions so lucidly and clearly set forth.

“So far we have only spoken of the essay; of the translation we have little to say. The translator has selected a good work, and translated it well. But he has added only four notes and a preface to his translation, and none of these, to our mind, are perfect.”—(*Athenæum*.)

"Mixed Temperaments best.—A temperament not mixed gives physiological traits disproportionately developed in the directions where that temperament is naturally influential. Thus, a temperament purely bilious gives dry muscles, harsh, angular outlines, coarse fibre, skin, and hair, so as to be unpleasing in exterior. A temperament purely lymphatic runs in the opposite direction, giving feeble muscles, excessive fat, dull eyes, clumsiness, lumpy features, oily skin, grossness. A temperament purely sanguine gives eyebrows too light, eyes liable to be red at the rims, features thin and sharp, person skinny, lips thin, mouth large, teeth projecting. A temperament purely nervous gives head too big, neck too small, chin too narrow, face forceless in expression, general febleness of air, bones too small, too little muscle, over-slenderness.

"As with the body, so with the mind; for the body lends color to the mental light which shines through it. Fortunate mental endowments will of course go far toward compensating for defects of temperament. But, generally speaking, a temperament too exclusively bilious gives a tendency toward harshness and angularity of mind; one too lymphatic, toward feebleness and indolence of mind; one too sanguine, toward hasty and fickle and superficial mental action; one too nervous, toward excessive and unhealthy mental action.

"Accordingly, the best temperament is one properly blended. It is worth while, perhaps, to add the suggestion, that a marriage likely to produce offspring of too unmixed temperament, tends so far to produce human beings not of the highest grade."—(*Am. Phrenological Journ.*)

"On the Mechanism of Speech. By ISAAC PIDDUCK, M.D.—To compare the mechanism of speech to that of a musical instrument, the organ, for instance: the chest is the bellows; the abdomen is the blower; the throat is the windpipe; the larynx is the reed; and, besides these, the cartilages and vocal cords are the strings; showing that the sounds of the voice are produced by the combination of a wind and a stringed instrument.

"The sound formed by the larynx, (consisting of the rima or chink,) the cartilages, and the vocal-cords, is divided by the tongue, the palate, the cheek, the teeth, and the lips into letters, syllables, words, and sentences. Upon the perfect formation and healthy condition of these several parts the strength, the rhythm, and the distinctness of the voice depend.

"But to play skillfully on a musical instrument long and careful practice is required. All persons learn to speak, as some persons learn to sing, by the ear; but very few either speak or sing correctly unless the organs of voice have been properly taught, and brought into perfect subjection by regular instruction and strict discipline. It was related of three young ladies, sisters, that they could sing, but not read aloud for any length of time, without becoming hoarse and losing their voice. They had been taught to sing, but not to speak.

"By way of illustration, let us consider—

"1st. The chest, or bellows. In order to speak with a loud and clear voice, so as to be heard distinctly at a distance, the capacity of the chest should be ample. This may be increased by exercise, by taking deep inspirations, and by holding the breath for a short time when the chest is full, suffering the air to escape gradually by counting aloud 1, 2, 3, etc., up to 50 or 70. By this means the chest may be expanded in every direction, and its capacity greatly enlarged.

"2d. The abdomen, or blower. Fullness of the abdomen is caused by

eating and drinking largely, and this, again, causes flatulence, distention, or the deposition of fat, especially by the neglect of exercise; and this impedes the muscular actions of the abdomen in expelling the air from the chest with sufficient force to produce a full volume of voice.

"3d. The trachea, or windpipe. And 4th. The larynx. These most important parts are liable to catarrhal and nervous affections by which the voice is lost, or is rendered hoarse and discordant—*vox faucibus hæsit*. The causes which produce this injurious effect are—breathing a close, heated atmosphere; by wearing warm wraps round the throat; by drinking freely of hot liquids, particularly hot tea; by spirit-drinking; by snuff-taking and tobacco-smoking; by the use of voice-lozenges; by straining the voice beyond its compass; and by frequently clearing the throat. The articulate sounds, the rhythm and *timbre* of the voice, being formed by the larynx, compounded of the cartilages, the rima, or chink, and the vocal cords, and being divided by the tongue applied to the palate, the teeth, and the lips into letters, syllables, words, and sentences, it is most important that all these several parts should be in a normal and healthy condition. If the tongue be too large or too small; if the palate be cleft, too arched, or too flat; if the cheeks or the lips be too largely or not fully developed, and the teeth be defective, the voice will be deficient in power, and the words will be indistinctly pronounced.

"In order to attain an effective elocution, the following rules should be observed:—

"1st. The speaker should stand erect, and the head not bent upon the chest, that the muscular movements of the abdomen, chest, and throat may be free and unconstrained.

"2d. The chest should be fully expanded by each inspiration at the commencement of every sentence. The disregard of this rule is a frequent cause of stammering. To fill the chest and to hold out the breath to complete each sentence, the inspiration should be made through the nose. By this mode of inspiring through the nostrils, the mouth and throat are prevented from becoming dry and the voice from becoming hoarse.

"3d. The pauses should be long enough for each sentence to reach its destination before it is followed by another; and, *cæteris paribus*, the slowness of the utterance should be in the ratio of the size of the room and the number of the audience.

"Learn to speak slow; all other graces
Will follow in their proper places."

"4th. Every word, if not every syllable, and almost every letter, should be distinctly enunciated, that the attention of the auditory may not be diverted from the sense to catch the sound. By this twofold effort the attention soon grows weary, and the hearer listless, and then instruction or amusement ceases.

"Among the faults of extemporary speakers, lecturers, and preachers, rapidity of utterance is one of the most common. Deliberation gives time for the choice of words; and, in consequence, the speech, the lecture, or sermon is more effective, is less tedious to the hearers, and commands greater and longer attention. This rule requires self-possession, a perfect knowledge of the subject, and an earnest desire on the part of the speaker to enlighten and instruct his auditory. Rapidity of reference and of quotation may excite astonishment, but it does not impart information, which should descend upon the mind as the dew from heaven."—(*Lancet*.)

“Overwork.”—Unwise above many is the man who considers every hour lost which is not spent in reading, writing, or in study, and not more rational is she who thinks every moment of her time lost which does not find her sewing. We once heard a great man advise that a book of some kind be carried in the pocket, to be used in case of an unoccupied moment, such was his practice. He died early and fatuitous. There are women who, after a hard day’s work, will sit and sew by candle or gas light until their eyes are almost blinded, or until certain pains about the shoulders come on, which are almost insupportable, and are only driven to bed by physical incapacity to work any longer. The sleep of the overworked, like that of those who do not work at all, is unsatisfying and unrefreshing, and both alike wake up in weariness, sadness, and languor, with an inevitable result, both dying prematurely. Let no one work in pain or weariness. When a man is tired he ought to lie down until he is fully rested, when, with renovated strength, the work will be better done, done the sooner, done with a self-sustained alacrity. The time taken, from seven or eight hours’ sleep out of each twenty-four, is time not gained, but time much more than lost; we can cheat ourselves, but we cannot cheat nature. A certain amount of food is necessary to a healthy body, and if less than that amount be furnished, decay commences the very hour. It is the same with sleep, and any one who persists in allowing himself less than nature requires, will only hasten his arrival at the mad-house or the grave. This is especially true of brain-work.”—(*Scientific American*.)

Nerve Cells.—“At the Académie des Sciences, M. BLANCHARD has read a favorable report upon M. Salvator Trichese’s minute preparations of the nervous system of the pulmonated gasteropods. M. Jacobowitch, some time since, demonstrated that the cerebro-spinal nervous system of the vertebrata really consists of three different descriptions of cells. From one of these the fibres are principally produced which constitute the anterior or motor roots; and from another the fibres which especially form the posterior or sensitive roots; while from others, termed ganglionic, prolongations occur, which, together with variable proportions of the two first, constitute the nerves. Since then, fibres of various descriptions have been met with in invertebrata; and now M. Trichese exhibits certain delicate preparations, exhibiting the very complex structure of the principal ganglions in several pulmonated gasteropods. He demonstrates in these medullary centres three kinds of cells perfectly distinguishable—large rounded cells, smaller and pyriform cells, and minute cells, without any distinct wall.”—(*Med. Times and Gazette*.)

“Indications of the Paths taken by the Nerve Currents as they traverse the Caudate Nerve Cells of the Spinal Cord and Encephalon.”—The above is the heading of a long and elaborate paper by LIONEL BEALE, read before the Royal Society, and published in its Transactions. It is beautifully illustrated from drawings by the author. For the anatomical descriptions the reader must refer to the original, as they are much too long to be inserted here, but we give the following as some of the conclusions Dr. Beale has arrived at: The peculiar appearance the author had demonstrated in the large caudate cells, taken in connection with the fact urged by him in several papers, that no true termination or commencement has yet been demonstrated in the case of any nerve, seems to me to favor the

conclusion that the action of a nervous apparatus results from varying intensities of continuous currents which are constantly passing along the nerves during life, rather than from the sudden interruption or completion of nerve currents. So far from any arrangement having been demonstrated in connection with any nervous structure which would permit the sudden interruption and completion of a current, anatomical observation demonstrates the structural continuity of cell nerve-fibres with nerve cells, and indirectly through these cells with one another. The author concludes, therefore, that the typical anatomical arrangement of a nervous mechanism is not a cord with two ends—a point of origin and a terminal extremity—but a cord without an end—a continuous circuit.

"The peculiar structure of the caudate nerve cells which I have described renders it, I think, very improbable that these cells are sources of nervous power; while, on the other hand, the structure, mode of growth, and indeed the whole life history of the rounded ganglion cells, render it very probable that they perform such an office. These two distinct classes of nerve cells, in connection with the nervous system which are very closely related, and probably through nerve fibres structurally continuous, seems to perform very different functions; the one originating currents, while the other is concerned more particularly with the distribution of these, and of secondary currents induced by them in very many different directions.

"It seems probable, according to the theory of Dr. Beale, that nerve currents emanating from the round ganglion cells may be constantly traversing the innumerable circuits in every part of the nervous system, and that nervous actions are due to a disturbance, perhaps a variation in the intensity of the currents, which must immediately result from the slightest change occurring in any part of the nerve fibre, as well as from any physical or chemical alteration taking place in the nerve centres, or in peripheral nervous organs."—(*Dublin Medical Press.*)

"*Influence of the Pneumogastric Nerves on the Submaxillary Glands.*
—M. OEHL finds that, by applying the galvanic current to the pneumogastric nerves, or to their central end, if divided, an increased secretion is produced from the submaxillary glands—the increase being greatest on the side on which the stimulus is applied. The augmentation appears to be independent of the sympathetic; for, while the secretion produced by irritating the pneumogastric nerves has the characters of ordinary saliva, that which appears—rarely, when the sympathetic is galvanized is much less in quantity, is thick and less transparent, and requires for its production a longer application of the stimulus. This agrees with the results arrived at by Czermak, Cl. Bernard, and Eckhard. When the lingual nerve and chorda tympani are divided, galvanization of the pneumogastric nerve does not produce an increased secretion on the side on which the section has been made; while, on the other side, an increase is produced. When both lingual nerves are divided, no effect results from galvanizing the pneumogastric; but, when the lingual nerve is divided so as to leave the chorda tympani connected with the central part of that nerve, then there is an increased flow of saliva after galvanization of the *par vagum*. These facts, according to M. Oehl, prove that the salivation which accompanies the nausea and precedes the vomiting produced by excitation of the pneumogastric nerve, is due to a reflex action of that nerve, conducted to the lingual nerve by the chorda tympani. It is proba-

ble also, that stimulation of the gastro-intestinal mucous membrane acts on the submaxillary gland in the same way as in the salivation attending the presence of intestinal worms. The secretion of the submaxillary glands is energetically excited by introducing into the stomach stimulants—such as infusions of mustard or pepper—so long as the pneumogastric nerves remain intact. The reflex action of the pneumogastric does not extend to the parotid gland.”—(*Gaz. Méd. de Paris, Brit. Med. Journal, and Dublin Med. Press.*)

Exsection of Nerves for the Relief of Neuralgia—In a report on surgery to the Illinois State Medical Society, (*Chicago Med. Examiner*), Prof. ANDREWS states that “the subject of the exsection of portions of nerves, for old and otherwise incurable neuralgias of aggravated character, has received some recent attention in this State. Some cases of ten years’ standing have been treated in Mercy Hospital with success. In one case the myeloid branch of the inferior dental nerve, which has been commonly supposed to be a motor nerve, was the seat of trouble, and the removal of half an inch of it effected a cure, showing that it has, at least in part, a sensory function. In all such operations it is important to remember that the cause of the neuralgia is situated, not where the pain is felt, but in some foramen, canal or notch through which the nerve passes, and in which the trunk of it is compressed by organic changes. The nerve, therefore, must be cut on the *proximal* side of such constrictions. For instance, the inferior dental must be cut by trephining the ramus of the jaw, and reaching it before it enters the bone. The direction of Gross to cut such nerves just at their exit from their foramina is proved by experience to be utterly inefficient. It is only in a few terrible and unusual cases of neuralgia, that the resections should be practiced.”

Influence of Periosteum on the Reproduction of Bone.—“The third meeting of the Medical Congress at Lyons was entirely devoted to the discussion of two surgical questions: 1. What surgical improvements have modern investigations on the osseous system effected? 2. On the value of the means which may advantageously be substituted for the knife with a view of preventing the accidents which result from wounds. The whole discussion on the first question was confined to the part which the periosteum plays in the regeneration of the osseous tissue. Here the two existing schools of surgery, the old and the modern, were in direct opposition: the former asserting the entire inactivity of the periosteum, and the utter inutility of preserving it in operations; the other attributing to that membrane the only active part in the regeneration of bones. M. Ollier, of Lyons, (who has acquired great reputation precisely on account of his numerous experiments on the periosteum, and the importance which he attaches to that membrane,) together with M. Verneuil, of Paris, warmly supported the latter opinion, while M. Desgranges and others attacked it.

“According to M. Ollier, the periosteum alone reproduces the bone; no other tissue can do the same. All bones may be reproduced, whatever their form. The condition of the general health of the patient is influential in the work of reproduction. This reproduction takes place in man as well as in the lower animals, clinical facts being here in accord with experimental facts: hence the necessity of sub-periosteal excisions—much easier and much more simple than resection by the old

system. In support of these assertions, M. Ollier presented to the Congress numerous anatomical specimens, the results of his different experiments. He showed, in cats, the radius and the peroneum reproduced in different parts where the periosteum had been preserved; whereas they were wanting where it had been taken away. In one specimen, which excited general admiration, the humerus of a dog was entirely reproduced with perfect regularity of form. M. Ollier exhibited short as well as long bones in which the osseous regeneration was visible. He insisted on the importance which should be attached to the influence of general hygienic conditions while considering the success or unsuccess following sub-periosteal operations.

"To these various arguments M. Desgranges answers: that experiments had been made by other *savants* which had proved unsuccessful; that it could not be supposed that a membrane wet with pus could produce the effects which are attributed to it; that if the periosteum can reproduce the osseous tissue in rabbits, such a fact has not as yet been clinically observed in man. And besides, why preserve the periosteum at all, when we are told that it can reproduce itself even when taken away? The periosteum, it had been said, tends naturally to attach itself to the bone; wherefore, then, the necessity that in amputations of limbs the extremity should be covered with the periosteum? If this were true, what a marvelous discovery it would be for surgery! There would be no inflammation; no suppuration of the bone. Unfortunately this was not the case. He had already tried it five times, and he had observed prolonged suppuration and greater difficulty to cure. The 'supporters of the periosteum' had extolled its utility in cases of comminutive fracture, but the Society of Surgery itself had lately discarded this notion. Besides, the term itself of 'sub-periosteal excision' was incorrect; for in Maisonneuve's cases and others, operations for simple necrosis bore that name. The true sub-periosteal excision would be rather the emptying of the bone proposed by M. Sédillot, of Strasburg. The true field for sub-periosteal excisions was to be found in osteoplastic operations, and hitherto they had proved unsuccessful. In conclusion, he saw no truth whatever in the new functions attributed to the periosteum.

"With these two discourses, which embody the best arguments on both sides, I leave the two schools in presence. Let me not forget, however, to mention, as an important feature of the debate, the presentation made to the Congress by M. Aubert, a medical practitioner at Macon, of a young man, aged seventeen, on whom he had performed an eminently successful operation. This young man had been affected with a caries which occupied the whole epiphysis of the left tibia, together with condensing osteitis occupying a little more than the lower third of the diaphysis. M. Aubert made an incision in the skin; separated the periosteum, and that very easily, as it was inflamed, and adhered but little to the bone; then, slipping a chain-saw beneath the periosteum, he took off all the diseased portion of the bone, and disarticulated the tibia at its lower extremity. Four years have elapsed since that operation, and the patient now possesses a tibia entirely regenerated, of the same form and volume as before. A very slight longitudinal depression scarcely indicates the part where the incision had been made. This new-formed tibia ends below with an ankle perfectly formed; and the young man, whose health is vigorous, can walk fifteen miles a day, and dance during several hours, without any fatigue. This brilliant success, which speaks in favor of the

sub-periosteal system, was saluted by the Congress with general applause."—(*Paris Correspondent of Lancet.*)

"*Odontological Society.*—November 7, 1864.—EDWIN SAUNDERS, Esq., President, in the chair.—CHARLES JAMES FOX, M.R.C.S., L.D.S., read a paper 'On the Preparation of the Mouth for the Reception of Artificial Teeth,' which ended with the following conclusions: First, that every tooth, properly so called, should be retained as long as possible. Secondly, that if any rule is to be laid down at all, it should be that roots must be extracted prior to the adaptation of artificial teeth, but that circumstances so often occur to render departure from any such rule necessary, and this is a question involving in so eminent a degree the judgment of the dentist, that it is not advisable to publish any rules which may hamper him in the exercise of his practice. Thirdly, that the use of temporary pieces is advisable where possible, and that the practice of a certain class of dentists of inserting teeth soon after the extraction of roots, etc., without having explained the results of absorption to the patient, cannot be too severely reprehended. The President expressed the thanks of the society to Mr. Fox for his very excellent paper. It was a subject full of interest, and one on which he hoped to hear some opinions expressed. After an interesting discussion, it seemed to be the general feeling of the society, as far as regarded the removal or not of roots preparatory to the adaptation of artificial teeth, that even roots should be retained as much as possible, but that cases must be judged on their individual merits."—(*Med. Times and Gaz.*)

"*Passivity of Metals.* By M. W. HELDT.—The author has made numerous experiments on the so-called *passive* state of metals—that is to say, that particular state in which the nature of the metal seems to undergo a permanent change by the action of certain agents, and has come to the conclusion that no such state really exists. The phenomena, he states, (1) are all produced simply at the surface of certain metals, those whose nitrates are insoluble in nitric acid, and the passivity belongs to this insoluble layer, and not to a particular electro-dynamic state or to a polarization. It is only those metals whose nitrates are soluble in diluted nitric acid and insoluble in concentrated acid which present these phenomena.

"With copper and tin the insoluble layer is visible to the naked eye; with others it can be seen with a lens. The acidulated water easily removes it, and the metal returns to its normal condition; the lixivium contains nitric acid, the presence of which is easily recognized, and also metallic oxide. With tin it is necessary to scratch or file the surface, because the oxide is insoluble.

"His other conclusions are as follows:

"2. Contact of the metal with platinum, in concentrated nitric acid, which, moreover, will attack the metal to a certain point, quickly determines the precipitation of an anhydrous nitrate, and puts an end to all action; the disengagement of gas ceases with the contact of the platinum. With tin the white film of insoluble oxide directly appears, even with diluted acid. With the other metals platinum effects nothing in the diluted acid, because it dissolves the nitrate formed. The contact of the metal with platinum accelerates oxidation, for the insoluble anhydrous salt spreads over all the submerged surface, as if it had been melted and

poured over it; and as all these salts are transparent and brilliant, the metal shines through them as if it had not been attacked. This is especially the case with copper.

"3. The rust of iron acts in the same way as platinum in concentrated nitric acid, in contact with iron. But in diluted acid it merely prevents the disengagement of gas, and the metal dissolves in the state of nitrate of protoxide, with which the binoxide of nitrogen forms blackish tints in the liquid. The liquid contains ammonia.

"4. The mass of metal has a marked influence on the decomposition of the acid. When in a very divided state, as filings or fine shavings, it will decompose an acid on which, in its compact state, it would exert no effect.

"5. In nitrate of lead, silver, and protoxide of mercury, iron acquires none of this so-called passiveness, the metal, when washed, having all the properties of metallic iron.

"6. Rust of iron, in contact with iron, precipitates the copper of its sulphate, while without contact of the iron no effect results. It is the same with iron oxidized by calcination at red heat. But iron steeped in concentrated nitric acid, and covered with a film of insoluble nitrate, does not act on the solution of sulphate of copper—not, at least, unless washed or touched in the liquid, with some readily oxidizable metal.

"7. Similar results may also be obtained by adding to the nitric acid a liquid in which the nitrate formed will be insoluble or nearly so. Thus zinc is but very slightly attacked in nitric acid, to which absolute alcohol has been added, and mercury is not attacked at all.

"8. Lowering the temperature produces the same results by diminishing the solubility of the salts. At 20° , zinc in monohydrated acid becomes covered with a white layer; but on removing the cooling mixture, this layer of nitrate dissolves, and the reaction becomes very violent. Acid with four equivalents of water, which violently attacks zinc at 0° , leaves it with all its brilliancy at 18° .

"9. When nitric acid is concentrated to the point at which it either does not attack a metal or attacks it very slightly, the addition of a little nitrous acid or binoxide of nitrogen determines the reaction, because these two compounds give up their oxygen more easily; but if the binoxide of nitrogen is absorbed by the addition of sulphate of iron, all action ceases.

"10. An iron wire rendered inactive by the coating of anhydrous nitrate touched with a metal, such as copper, zinc, or iron itself, either in the liquid or after withdrawing it, the disengagement of gas recommences, and the chemical action is renewed; this is simply because at the points of contact the unattackable coating has been disturbed; the acid being again in contact with the metal, the oxide of nitrogen which is formed glides between the metal and the coating, and detaches it (?).

"11. With nitric acid, carbonates behave in the same way as metals. Fused carbonates of soda and lead are not attacked by concentrated nitric acid; carbonate of baryta may even be placed in contact with boiling concentrated nitric acid without undergoing decomposition. Nitrates of soda, baryta, and lead are insoluble, or nearly so, in concentrated nitric acid; but saltpetre dissolving in it, concentrated nitric acid attacks carbonate of potash—at least, on the addition of alcohol.

"12. In contact beneath the acid, with bismuth, tin, iron, or copper,

platinum forms with them the element of a pile, of which it is the negative pole. The tin immediately becomes covered with a kind of enamel of white oxide, without any apparent disengagement of gas; with iron, bismuth, and copper, the deposit is like glass—a transparent, brilliant nitrate of peroxide. This current occasions the highest degree of oxidation. In diluted acid, the contact of the platinum has no effect, because the current is not strong enough to condense on the metal sufficient acid to form this salt of peroxide, and prevent the disengagement of gas, which prevents the unattackable coating from adhering to the surface.”—(*Les Mondes* and *Chem. News*.)

Composition of British Coin.—“It is a remarkable fact that scarcely any serious alterations have been made in the purity of English coins of gold or silver for many centuries.

“When Henry III. introduced gold coin into our mints, the metal of which they were composed was that known as twenty-four carat, or pure gold, without a particle of alloy. So it remained until Edward III. ordered a reduction of the standard to twenty-three carat three and a half grains fine gold, and half a grain of alloy. It remained for Henry VIII. to take further liberties with the gold coinage, and this he did unsparingly. He debased it to twenty carats, with the exception of a certain small coinage of crowns of gold, which were composed of twenty-two carat metal, that is, twenty-two parts of gold to two of alloy, and which mixture thenceforth took the name of crown gold. In the reign of Charles II. this latter rate of purity was made what it has continued to be up to this hour—the sole standard of all the gold coins of the realm. It will thus be seen that in spite of the nefarious proceedings of Henry VIII. in regard to the gold coinage during the last twenty years of his reign, the mutations of purity it has undergone are inconsiderable; and coming to the silver coinage, it is a striking circumstance that for nearly seven hundred years—again excepting some tamperings of the monarch just named—its standard of purity has remained unaltered. For example, the silver coins of Henry II. were composed of a mixture consisting of eleven ounces and two pennyweights of fine silver and eighteen pennyweights of alloy. Those of her Majesty, Queen Victoria, are of precisely the same degree of fineness, and it is not at all probable that for centuries to come, the standards of either our gold or our silver coins will be interfered with. In both cases we have obtained compositions—the alloy used being the purest copper—which give hardness and beauty of appearance to the individual pieces of money resulting from them—and these are desiderata, the importance of which is sufficiently obvious. Of the subordinate and inferior currency it may be said that from the year 1672 (*temp.* Charles II.)* to the year 1860, when the present bronze coinage was inaugurated, it has been composed of copper. There is no doubt about the superiority of bronze over copper for the purpose of conversion into coin, although the mechanical difficulties attending the operation are certainly much greater. The addition of four per cent. of tin and one per cent. of zinc has the effect of hardening the remaining ninety-five per cent. of copper to an extent which

* A small coinage of tin by way of experiment was struck in 1684 by the same monarch. This was deemed a failure, as were those of pewter and gun-metal struck by James II. and abandoned.

is incredible to any but those who have witnessed the labor of rolling and stamping the compound, and which illustrates the fact that the ancients used bronze for cutting implements before steel had become known.”—(*Intellectual Observer.*)

Plating Metals.—“Among the papers recently read before the Academy of Sciences, Paris, we may notice one by M. WEIL, ‘*On New Processes for Covering Metals with Firmly Adherent and Bright Layers of Other Metals.*’ The method consists in dipping the metal to be coated in a saline solution of the metal to be deposited rendered distinctly alkaline with potash or soda, and mixed with some organic matter, such as tartaric acid or glycerin. At the same time, it is necessary in some cases to set up a weak voltaic current by keeping a piece of zinc or lead in contact with the metal. In this way the author obtains a firm layer of copper on iron and steel, and procures various and beautiful effects according to the thickness of the copper deposited. Silver, nickel, and other metals can be applied in the same way. The process, it will be seen, is susceptible of numerous applications. A curious fact mentioned is that a clean surface of copper may be coated with zinc by placing the two metals in contact in a solution of caustic soda or potash. In the cold the deposit of zinc takes place slowly, but at 100° it is effected rapidly.”—(*Chem. News.*)

Lea’s Cleaning Solution.—The photographic fraternity is under great obligations to Mr. Carey Lea, of Philadelphia, for the knowledge of the following glass-cleaning preparation: Water, 1 pint; sulphuric acid, $\frac{1}{2}$ ounce; bi-chromate potash, $\frac{1}{2}$ ounce. The glass plates, varnished or otherwise, are left, say 10 or 12 hours, or as much longer as desired, in this solution, and then rinsed in clean water, and wiped or rubbed dry with soft white paper. We have used the solution in our laboratory long enough to be satisfied of its superior excellence for the purpose specified. It quickly removes silver stains from the skin without any of the attendant dangers of the cyanide of potassium. We think that photographers who once give Mr. Lea’s preparation a trial will be glad to discard all others.”—(*Sci. Amer.*)

Paraffined Wood.—Mr. STUART GWYNNE has experimented in the preparation of wood for fine work, in which quality is of more importance than cheapness, and has found that paraffine is the best substance with which to saturate it. It resists moisture, acids, alkalies, and the prevalent causes of decay and change of dimensions, and is easily forced into the pores, as it fuses at a moderate heat, and it does not injure other substances. He thinks it will preserve the panels which artists paint upon, so that they will not warp and split, and will be applicable for coach and joiners’ work. But the work he has applied it to is engineer’s work, such as the teeth of wheels, for which it appears to have all the qualities desired. He intends to patent the use of it for such purposes if further trials confirm his present views of it.”—(*Amer. Artisan.*)

Liquid Glue.—Dissolve 1 lb. of best glue in 1 lb. of water; add gradually 1 ounce of nitric acid of sp. gr. 1.36, and heat the mixture for a short time. This will save the trouble of heating the glue-pot.”—(*Ibid.*)

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, FEBRUARY, 1865.

No. 7.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Caries of the Teeth.—We did not intend, when publishing the article on dental caries, in the last number of the DENTAL COSMOS, to say anything more about it than what was said in a general sense, and to refer to the diagrams, as it is not likely that very satisfactory conclusions to all could be arrived at. Observation and experience must still hold their sway in directing us how to ameliorate the effects of caries when it makes its appearance on the human teeth, no matter how clear fine-spun theories may seem to demonstrate its character, origin, or pathology. We know very well that the caries of the teeth does not go on in the same patient at the same rate during the whole life, independently of the variations of health, place, manner of living, etc., but is constantly changing. From this view of the case, the condition of the health of the patient seems to exert an influence on the texture of the teeth themselves, as well as the influence of the constantly changing character of the secretions of the buccal cavity and the breath. We know of no one case that would seem to fully establish any given theory; we must treat caries as we find it, keeping in view the health of the patient, cleanliness of the teeth, and well-directed dental operations. We have some patients whose teeth decay rapidly if they live in a malarious district, but if they live temporarily in a place free from such influence the decay ceases. Many of our patients' teeth decay less in summer while living at their country places and in the open air, than in the winter season while housed more in the cities; hence, we find more decay in the teeth of our young patients in the spring of the year than in the fall. Females bearing children generally have more decay of the teeth during that period of their lives than at other

times; the teeth may seem to be for years free from decay, and all at once commence to decay very rapidly. A case occurred, and it is but the type of many, in a lady patient, a school teacher. During her girlhood, before twenty years of age, had good teeth, very few plugs; the decay ceased for a period of fifteen years; she was a single lady, and of rather lean habit; her health changed apparently for the better; she became quite stout, but her teeth commenced to decay very rapidly. In a single summer about twenty cavities formed, and in three years she died of tuberculosis. In that time nearly all her teeth decayed down to the gums; the teeth seemed to wash away by the fluids of the mouth, as if they were only lumps of hard clay. Dilute acids of the mouth doubtless are the direct causes of decay, as well as the modified character of the teeth themselves. As to the *modus operandi*, or as to how the effects are brought about, is still a mystery to us. We believe we modify the effects of decay by giving lime-water to patients when decay is going on rapidly, and the use of prepared chalk as a dentifrice, and still recommend it where decay is rapid; the sulphate of lime is considered by some to be better, taken internally, than the lime-water.

A lady of fifty years of age called to see us from a distant city, a few days ago, who had lost most of her teeth in early life, but for the last fifteen years had no decay. She was of lean habit, and of the blonde temperament. We found eight cavities, white decay. We had not seen her for two years before. We remarked that it was very strange that she had no decay for so long a time, fifteen years, and now should present cases of such rapid decay. "Well," she replied, "I don't understand it." We remarked that the decay in her teeth looked as though she had been in prison, and debarred from the open air. "Oh, well, that may be so; I have been confined to but one room most of my time, attending to an aged and sick mother for over one year; she is childish, and will suffer no one to attend her but me." We remarked, that accounts for it; any impression on the mind or change of habits which impresses the system and changes the secretions will, as a rule, cause decay of the teeth. Some have asserted that the white race have decay of the teeth because they breathe through the mouth; this is all sheer nonsense; some patients we know never open their mouths except when they speak, and very little then, and their teeth melt away as if they were corked up in a bottle of sulphuric acid. It has been said that the reason why the Indians have good teeth, they breathe through their nostrils instead of the mouth. To compare the Indian with the white race is absurd; we never for a moment expected to refer to such an absurdity when it was mooted, except to suggest that the barbarous and civilized races bear no comparison in any respect, physically, morally, or mentally. We received a short time since the jaws and teeth of White Cloud, the Indian chief, who was executed in Minnesota. The teeth are all sound, large, and well formed, appa-

rently as much lime in them and the jaws as would make a half dozen sets of jaws and teeth of a well-bred lady or gentleman raised in civilized life.

Fig. 1.*

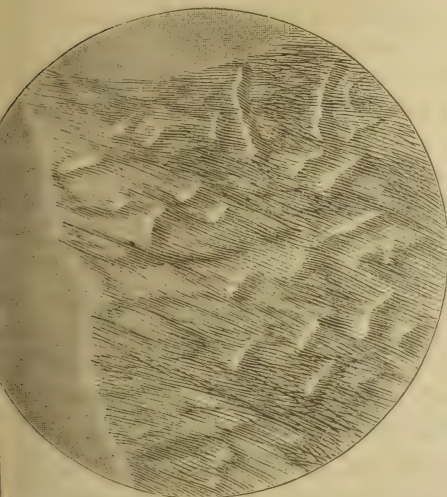
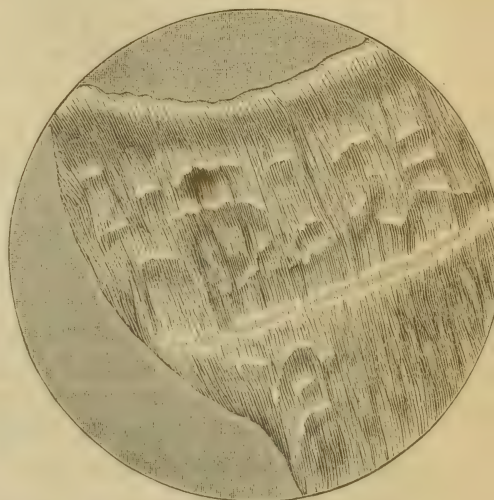


Fig. 2.



(To be continued.)

INDIA-RUBBER FOR ARTIFICIAL PLATES.

BY THOS. W. EVANS, M.D.

Copy of a letter to the Members of the Massachusetts Dental Association.

PARIS, NOV. 28, 1864.

GENTLEMEN:—During my recent brief visit to the United States, Prof. J. D. WHITE, of Philadelphia, put me in possession of a copy of the letter addressed by you to the Pennsylvania Association of Dental Surgeons in regard to certain letters-patent of Mr. John A. Cummings, of Boston, claiming the exclusive right to use India-rubber for artificial palates and for plates to serve as a base for artificial teeth. The little time I had at my command in America did not permit me then to give that attention to your communication which its importance demands. As a member of the Pennsylvania Association, I have felt imperatively called upon by your letter to communicate the knowledge of certain facts of which I am personally cognizant, and which, I trust, will throw a clearer light upon the real worth of the claims now put forward. Sincerely desirous of seeing simple justice done to all parties, and of co-operating in the worthy object you have in view, I trust you will excuse me speaking

* These cuts were referred to in the January Number, page 306.

on the present occasion of matters somewhat personal to myself, and which, under other circumstances, I should have hesitated to mention.

It was in the autumn of the year 1847 that I first quitted the United States and established myself in the practice of the dental profession in Paris. In America, where I had first studied my profession, I had been educated to the belief, then universally accepted by the dentists of the United States, that the best and most practical artificial pieces were those with metallic plates and mineral teeth. I was struck, however, on my arrival in Europe, with observing, both in England and on the continent, the very general use in mechanical dentistry of pieces made of "bone," (either ivory or of tooth of hippopotamus.)

From a knowledge of the long experience and high reputation of the leading European dentists who adopted this practice, I could not but believe that this system must possess certain decided and important advantages to recommend it to such general favor. From personal observation I was myself soon convinced that, among the advantages of "bone," were particularly an elasticity of fibre closely analogous to that of the human bone-tissue, and a light specific gravity which rendered it less liable to hurt the gums than the combination of metal and porcelain. While these facts in its favor were placed beyond question, there were, at the same time, certain grave disadvantages no less observable, which seemed, in my judgment, to more than counterbalance the apparent advantages. The bone artificial-work, through the action of the secretions of the mouth, changed color readily, soon decomposed, and became very offensive, thus necessitating frequent renewal. From a careful study of the relative merits and demerits of the two systems, I was led to make a series of experiments with a view to discover some material which, combining the advantages of both, should offer a permanent resistance to the action of the fluids of the mouth, and at the same time possess the elasticity and lightness of the natural bone.

One of the first substances upon which I experimented was *Caoutchouc*. My efforts were particularly directed how to modify its elasticity and how to change its color. In the early part of the year 1848, I devoted the leisure, which the derangement of the French Revolution afforded, to working out these problems, being then, and even now, still totally unaware whether any efforts were being made at the time by other parties toward their solution. I had already proof that sulphur was a substance very little liable to decompose or change in the mouth. The knowledge of this fact led me by natural induction to think of combining it with caoutchouc. After trying many plans to work together the two substances, I hit upon the application of dry heat, and I succeeded in producing a material hard, black, and possessing the elastic properties of horn. In fact, one of the earlier original pieces of the substance thus discovered, I put away in a drawer of my cabinet, and upon the paper

enveloping it I wrote at the time the following words: "Tried to make ivory, succeeded in making ebony." Subsequently, by employing successively moist heat and then steam, I obtained still more satisfactory results. The specimens of the substance finally produced were in every respect identical with the vulcanized India-rubber now in use, with the exception of color, and this I sought to modify by employing various coloring materials in composition. The colors which I thus obtained did not satisfy me altogether.

From the year 1848 forward, I continued, from time to time, to make new experiments upon caoutchouc. From a previous experience, however, with another preparation which had at first promised most excellent results which the lapse of time did not confirm, I used the utmost caution in adopting the hardened caoutchouc into my practice, as I wished, first, to assure myself more positively of its durability and practical value. I have always felt that great discrimination was requisite to decide the particular cases in which it could be beneficially employed. The cases in which I have found it particularly applicable have been the following: where, in either jaw, the molar teeth require to be very high, especially in the lower jaw, where there has been much absorption, or in the upper jaw, where, from the great absorption of the alveolar processes, it has been necessary to bring out and restore the true conformation of the mouth. I have found it specially valuable in cases also where, through wounds or surgical operations, a portion of the bone has been carried away or removed, and it has been necessary to supplement the defect by artificial means.

In 1851 my attention was drawn to the fact that Mr. Charles Goodyear, Sen., had taken out patents in the United States for the discovery of a new substance which, from the description given, seemed to resemble what I had myself independently discovered. Toward the close of the same year, or early in 1852, a Mr. Charles Morey applied for letters-patent in France for hard India-rubber; and, as Mr. Goodyear had not taken the precaution to secure his own patents in France, the application of Mr. Morey was favorably entertained, and a patent was awarded him by the French Government. I had previously fully acquainted Mr. Morey with what I had myself succeeded in doing, and he was candid enough then to admit that, so far as he was able to know, my experiments had been made in advance of the date of Mr. Goodyear's patent in the United States. Mr. Goodyear, Sen., on coming to Paris, made an arrangement, I believe, with Mr. Morey, by which the latter transferred his own patent and received a certain interest in those of Mr. Goodyear's.

After the close of the Great London Exhibition of 1851, Mr. Goodyear arrived at the "Hotel de Louvres," in the Rue de la Paix, Paris. The next morning after his arrival I called upon him, and had a full and free conversation with him on the subject of caoutchouc, on which occa-

sion I mentioned in detail my previous experiments, and my hopes from the use of caoutchouc for dental purposes. I have a most distinct and vivid remembrance of one remark in particular which he made in reply. "Here, again, is a new application which I never thought of!" He urged me to make him a set of teeth with caoutchouc as the base, and I did make him, not only one, but several pieces for his mouth, one of which I still retain in my possession, and which, I think, is quite as good, as regards the material, as any I have since seen. After hearing the account of my own experiments, he expressed the wish that I would take no steps to contest his patents for hard India-rubber; and, by way of consideration for my making no opposition to his claims, he proposed, of his own free will, to give me the exclusive right to his patents for the entire Continent of Europe, he to retain for himself all of the United States and England. To this proposal I made an instant and decided refusal, basing my refusal on the ground that I was opposed upon principle to any patents within the domain of professional science. I also took occasion to state to him that I should unhesitatingly claim at all times what I felt to be my right, and that I should continue to use, and should urge others to use, caoutchouc as a base for artificial teeth, without paying any regard to any patents. And this course I have undeviatingly pursued to the present time.

Subsequently to the first visit of Mr. C. Goodyear, Sen., his son, Mr. Charles Goodyear, Jr., came to Paris. He called upon me several times, and I spent a good deal of time in fully acquainting him with the various processes I employed in making my moulds, in manipulating and moulding the substance, in adjusting the teeth, etc. In May, 1855, he took out a patent for the application of caoutchouc as a base for artificial teeth. I learned this fact with surprise, as I had strongly expressed to him my desire that this application should never be patented. My opinion was clear then, and still remains unchanged, that this patent, not being for an original invention, was certainly not entitled to stand good, and that the members of the Dental Profession, therefore, had an indisputable right to the unrestricted use of caoutchouc in the operations of mechanical dentistry.

In 1858, Mr. Putnam, of New York, called upon me in Paris, and informed me that he had brought with him specimens of an improvement in caoutchouc, for the secret of which he asked a consideration. He exhibited several pieces of artificial work in caoutchouc, which I noticed had stamped upon them the words "Goodyear's Patent." He was under the impression that he was showing something entirely new in Europe. To undeceive him, I produced, to his astonishment, some pieces of my own, which had been made several years, and which bore a close and striking resemblance to those which he had shown me. I stated to him frankly, that as the result of my own experience, I had found that in the

hardened caoutchouc there was an uncertainty of result, as its consistency could not be always depended upon, it being sometimes more porous, at other times more brittle. He gave me assurances that he could give me certain information as to the mode of baking and of manipulating the material, which would obviate these difficulties and give an uniform definiteness of result. He spent several days in making experiments, but he failed to obtain anything better, or any greater degree of uniformity than I had myself. The year following he came abroad with a new machine for vulcanizing, which appeared to possess advantages over that which I then had in use, and I therefore purchased one of him, as it was my wish to obtain every improvement which appeared to offer any advantages.

Within a few years past, as is well known, many improvements have been made in vulcanizing machines and in the use of vulcanite. But the members of the Dental Profession have been desirous to have the liberty to use these improvements thrown open to all. Quite recently, a number of the leading dentists, both in England and in France, have concurred in a declaration to the effect that the introduction of vulcanite into mechanical dentistry has been of great advantage to the profession and of immense benefit to humanity, and that its use should be therefore left untrammelled by any patent-rights whatsoever.

In conclusion, gentlemen, I need scarcely add that I cordially wish success to the efforts put forth by your association, in which I doubt not the entire Dental Profession in America will heartily concur.

IRRITATION.

BY WM. H. ATKINSON, M D.

Read before the Society of Dental Surgeons of New York City, June 29, 1864.

THIS, as usually apprehended, is excitation of function; anything therefore capable of producing accelerated motion of the various acts of nutrition, singly or combined, may properly be called an irritant.

This agitation always occurs in the cells composing the parts said to be in action or being acted upon.

Just what it is that causes the act (inspiration) which precedes the appropriation of foreign substance causing the cells to enlarge, is not easy of announcement so as to satisfy the majority of minds; but when it becomes exhausted or satisfied, the cells cease to draw into themselves the morphological elements in nearest proximity to them, and thus the irritation becomes limited to a few adjacent cells, whether they be connective, glandular, vascular, or nerve cells, singly or combined.

The fact that the irritation is not propagated throughout the gland, vessel, or nerve, parts of whose territories are invaded by the lesion, proves that irritation, in the strictest sense, is an action of individual

cells, limited to these and their territories, rather than that of the glands, vessels, or nerves, which only become involved so far as their constituent cells are made to take on the abnormal condition.

Irritation may be divided into normal stimulus, by which the nutrient act is maintained, and traumatic irritation, which subdivides into dynamical and mechanical modes of manifestation which are abnormal, either in degree or character threatening to dislodge the life entity from the part in which they are displayed.

Perversion of the normal stimulus, or rather the irritation or action induced by it, is probably the "irritation" of the inflammatory process properly denominated poisonous.

It is by the presence of this irritation of perverted nutrition that the mucoid and neural sea becomes capable of taking on local perversions of cells constituting constitutional disease. A fitness of the neural and mucoid sea is the antecedent of catalysis of local origin.

The mucoid sea of morphological elements is the source of supply to cells composing glands, vessels, nerves, bones, cartilages, muscular and dermoid structures, so if we are able to comprehend individual cell action and the ebb and flow of this mucoid sea of composite elements added to the regular neural and vascular circulations, which are only enlarged examples of the same acts of ebb and flow in the cells, we have a basis upon which to predicate all the possible mutations of physical being in formation, nutrition, and growth, physiological and pathological.

The vascular circulation brings the homogeneous products of the digestion of the food and empties them into this mucoid sea, and takes back in exchange the debris of cell actions and effete odds and ends floating therein, and casts them off through the various outlets in the mucous and dermal surfaces, thus keeping a constant supply of well-prepared pabulum within reach of every variety of cell.

But when we speak of the products of digestion histologically and strictly anatomically, we have covered the whole range of cell actions, involving completest solution and admixture of the corporal elemental mass, from which the body is formed and reformed in the continuous cell movements denominated nutrition, the purpose and use of which is to break up old and establish new relations among the entities of which it is composed; thus establishing desire and necessity for variety of contacts in these beginnings of individual forms of existence.

The so-called physical agents capable of setting these affinities in motion are called stimuli.

When they incite these acts in serial, regular order, they are nutrient in character, and properly denominated food, if you please, cell-food.

Breathing or respiration is the only essential function necessary to life of cells, but it also constitutes cell eating, for (a) *cell inspiration* is swallowing, (taking foreign substances within its own proper self;) (b,)

cell digestion is exactly equivalent to lung digestion, and principally consists in chemical placement of the proximate elements of bodies contained in the air or the mucus which respectively enters lungs or cells; it is also the equivalent of alimentary digestion upon a smaller and refined scale; (c,) *cell expiration* is the proper systolic act of cells disposing of that which they cannot or will not appropriate into their own specific individuality. (1,) Inspiration, or diastole; (2,) digestion, or intra-cell action, and (3,) expiration or systole, complete all the possible functions of cells.

Stimuli which principally induce any one of these specific acts in cells are denominated medicines, and are divided into (1,) sedatives or relaxants, (2,) tonics, and (3,) astringents. (1,) sedatives induce (1,) inspiration or diastole; (2,) tonics accelerate intra-cellular activity, (2,) digestion, or movements among the contents of cells; (3,) astringents induce (3,) expiration or systole of the cells and reduce their volume. The effects produced by these various substances are more or less persistent according to the strength and singleness of the affinities obtaining among the lowest (crystalline) bodies; multiplicity of affinity indicating elevation in the scale of organic refinement in the ratio of the number of the affinities the body possesses or is capable of, and obtaining in completest expression with the highest possible order of being.

The *force* by which cell-action is produced seems to be, like all molecular power, absolutely infinite.

The splitting of the trunks of large trees from pith to bark, centre to surface, with or without perceptible report, by the freezing and thawing process, as well as the few examples observed, and on record, of the splitting, with sharp and loud detonations, of the teeth when under the pressure of this force during inflammatory change in their pulps, giving instant relief, are notable examples.

Also the so-called capillary attraction is nothing more or less than an expression of this ethereal affinity, which is as unmeasurable and therefore as infinite.

The "irritation" of the inflammatory process, then, cannot exist without fundamental lesion of cells. Therefore simple mechanical lesion in a healthy system cannot produce the irritation of this process, it simply incites nutrient irritation, and thus the lesion is repaired by an action set up by the mechanical cause producing it.

But where the constitutional powers are low, and the neuro-mucoid sea is just ready to be made the scene of rebellious and discordant displays of vital force, a simple mechanical lesion may so depolarize the locality in which it occurs that inflammatory irritation may suddenly be propagated to vast extent, exciting disease throughout the dermal, glandular, and circulatory systems.

Thus we see dynamical and mechanical lesion merge into each other, and really differ but in degree and circumstance.

The inflammatory process, then, is an effort upon the part of the systemic powers mediately to re-establish normal nutrition in the part or system in which it has its seat, and irritation is its first effort or expression. Its formula then may read :—

Trauma = Lesion, break.

Dynamic Lesion = Contagion, Infection.

Mechanical Lesion = Displacement, Separation.

Chemical Lesion = Dis-Solution.

Irritation, then, may be local or general; involving, it may be, a single cell, or district of cells of various tissues or extending throughout the entire jelly-like mucus mass within and without the vascular, neural and cell circulations from which the supply of nourishment of the whole body is derived, inducing conditions that are recognized by pathologists as idiopathic or symptomatic expressions of disease strictly "local" or "constitutional."

LITTLE THINGS.

BY J. S. LATIMER, D.D.S.

ALLEN'S DAM was described in my last batch of *Little Things*. I so designated it because I learned of it from Dr. A. It has since come to my knowledge, through Dr. Allen and the inventor, that this simple and effective device originated with Dr. Metcalfe, of New Haven. I take pleasure in making this correction, and shall in future, so far as possible, endeavor to learn the names of the parties who originated the devices recommended, though, if gentlemen keep their good things to themselves, the profession owes them nothing, and they should not complain when others get credit for giving to the world ideas which have been kept in the strong box, or which indolence has prevented them from publishing. These strictures do not apply to Dr Metcalfe, who is a generous and growing man.

WAX OVER MEDICINE, applied to devitalize a pulp, will frequently cause pain by the pneumatic pressure. Sandarach varnish is used to saturate cotton for covering the medicine, but unless the varnish is applied after the cavity has been filled with cotton, we have the same difficulty from pressure upon the pulp. Besides this, the alcohol of the varnish dilutes the creosote of the arsenical paste and lessens the soothing action. For the past year I have filled over the medicine loosely with cotton, and then taking a pellet of wax on the blade of one of Wood's pluggers, (No. 2,) have melted the wax in the flame of a spirit-lamp and touched it to the cotton. Pellet after pellet is absorbed by the cotton until the surface indicates that the plug is impervious to the saliva.

A SINGULAR CIRCUMSTANCE.—In March, 1862, I removed the pulp from the superior left first molar for a young Miss. Not being able to

remove it completely at that sitting, I inserted some creosote, and over it cotton, which I saturated with sandarach varnish. The patient was instructed to call in three or four days for the completion of the operation. About the first day of December, 1864, she came to me again; having failed to keep her engagement, in the first instance. The tooth had been comfortable until within two or three days, since which it had given evidence of periodontitis. I found it nicely filled, and no more decayed than when I left it. The cotton and varnish had become exceedingly hard upon the surface, so that considerable labor was required to remove the filling, and the excavated cavity and pulp chamber were as dry as a gold plug could have kept them. That the plug was impermeable was proved by the fact that its removal gave immediate relief.

CHLOROFORM is an excellent soothing agent. In a majority of cases, teeth afflicted with abscess, but having no fistulous openings for the escape of pus and gas, will become quite painful if sealed up with gutta-percha, until they have been treated awhile. At first they may be sealed with cotton and wax. After four or five dressings the temporary filling over the medicine may be made of gutta-percha, into which has been kneaded precipitated chalk. This retains the medicine perfectly, and prevents the taste of iodine and creosote from being uppermost in every meal. If we have made the attempt too soon, active inflammation will be set up and we will be called upon to afford relief. In this case, removal of the filling and a pellet of cotton saturated with chloroform loosely inserted into the cavity give almost immediate relief. If the inflammation has progressed considerably, the chloroform may be frequently applied.

ALLEN'S SUSTAINER.—It frequently happens that we find it necessary to strengthen rubber plates by imbedding within them pieces of gold plate. To keep such pieces in position during the processes of packing and vulcanization is sometimes difficult. An effectual method is to solder two pieces of gold wire to the lingual face of the gold plate long enough to extend up well into the counter half of the matrix and be held in the plaster. After vulcanization these pieces of wire are cut off close to the plate, and only the two glistening little eyes of gold remain to indicate the imbedded metal. But Dr. Wm. H. Allen simplifies the plan by cutting his piece of plate in such a way as to leave two arms standing out from the edge, which, being bent at a right angle with the lingual face of the plate, answer the same purpose the wires did and require much less time and labor.

NERVE BROACHES may be prepared by any practitioner quite easily, and, with a little practice, much better than is done by those who have knowledge only of the manipulation of steel and no idea of the extremely attenuated dental canal. The finest Swiss broaches should be placed in

a piece of iron or brass tubing. The ends of the tube being sealed, it is heated to a cherry red and allowed to cool very slowly. When cool, the broaches may be removed from the tube and barbed by placing them upon the ivory handle of a plugger, for instance, and cutting lightly, and at an angle of about 15° with a *thin* and *sharp* instrument. Only one of the four angles should be serrated, and no hooks need be made on the ends of the broaches. The barbs may extend from about one line from the point to half an inch or more above it. Do not try to use a broach a second time unless you find the barbs still sharp. After being passed once into a fang they generally have their barbs destroyed. After this they may be employed in pumping medicine into suppurated teeth, or they may be reannealed and rebarbed.

IN REGULATING TEETH I have found blocks of caoutchouc, (India-rubber,) fastened to the rubber regulating-plate with fine binding wire, answer an excellent purpose as constant workers. Rubber can push as well as pull.

OPENING VULCANIZERS, after the process of vulcanization, is not always easily accomplished, especially if they happen to be of the Whitney pattern. Happening to get this fact fixed in my mind by such an accident lately, and being helped out of trouble by a very simple device, I made a note of it for your benefit. After trying with might and main, and exhausting the strength and ingenuity of a much stronger man than myself, I took the obstinate thing to the laboratory of a neighboring dentist, who relieved me from the difficulty by placing the heater horizontally upon the floor, and, with one foot on the piece of board which served to prevent the heater from turning, and the other upon the wrench, started the cap with ease.

BARBAROUS PRACTICE.—the following was clipped from the New York *Sun* of October 25, 1864. I happen to know that Dr. (?) Schœning is a barber, and only a self-styled doctor:—

CORONER'S INQUESTS.—*Fatal Result of Pulling Teeth.*—On Sunday forenoon, a lad about four years old, named Patrick James Green, whose parents reside at 541 First Avenue, was taken to the dental establishment of Dr. George Schœning, 445 Third Avenue, to have some teeth which pained him extracted. His father accompanied him. Two of the teeth were quickly drawn, but while the third one was being extracted the little fellow was seized with convulsions, and, turning black in the face, became insensible immediately. He was removed from the chair by his father, and two physicians were soon procured by the dentist, but when they arrived life was extinct. In the opinion of the medical gentlemen, the extreme fright and pain experienced by the deceased produced congestion of the brain, and a verdict to that effect was rendered by the jury. No blame was attached to the dentist.

KEROSENE HEATER FOR VULCANIZING.

BY DR. A. J. WAID, DENTIST.

I HAVE had a chimney made of common tin: length $7\frac{1}{2}$ inches, diameter at the top or small end $\frac{7}{8}$ of an inch, and flanged out at the bottom diameter 5 inches. A cylinder made of the same material, open at both ends, length $13\frac{1}{2}$ inches, diameter $4\frac{1}{2}$ inches at top and 5 inches at bottom; about $\frac{1}{2}$ inch of the bottom was flanged out so as to rivet it to the bottom of the chimney; no soldering was used to make it. Near the top end of the cylinder had four holes made $\frac{1}{2}$ inch in diameter.

This cylinder is the right size to hold my vulcanizer, which is for two flasks, so that the bottom of the vulcanizer is nearly $\frac{3}{4}$ of an inch above the chimney. The size would need to be varied according to the size of one's vulcanizer.

The above cylinder and chimney are my invention. They are placed upon an iron stand of Fish's Patent Lamp-Heating Apparatus for Kerosene, beneath which is placed his Metal Lamp, No. 3, with the largest size, or mammoth burner, purposely constructed for heating, and on which rests a zinc bulb or base, (in one side of the zinc bulb is a mica window enabling you to see to regulate the flame,) the upper part of which rests upon the iron stand, fitting within the bottom of the chimney, so that when all are arranged and in place the whole may be moved by simply taking hold of the stand.

I have used the above apparatus over two months, and it works well; can get more heat by it than I wish.

GOUVERNEUR, N. Y., Dec. 19, 1864.

PROCEEDINGS OF DENTAL SOCIETIES.

BROOKLYN DENTAL ASSOCIATION.

November 16, 1864.

BY DR. W. C. HORNE.

PERIDONTAL INFLAMMATION being the subject for the evening's discussion, Dr. Hurd stated the particulars of a case in which he removed the devitalized pulp of a lateral incisor, and filled the fang and crown with gold. After several months there were symptoms of inflammation, which were allayed by applying chloroform to the gum over the fang; this recurred at long intervals, always yielding to the same treatment.

At length, nine years after being filled, the tooth became extremely painful; the former treatment availed nothing, and the patient insisted on its removal. It was then cut open, and the fang was found filled per-

fectly to the point. The doctor expressed his desire to hear from any gentleman who could explain the phenomena involved in this case. Other gentlemen present referred to like instances which had come under their observation, from one to three years after filling.

Dr. Atkinson said, to receive satisfactory answers to such questions, it was necessary to present the case "in toto." To announce any doctrine in simple formula, was to be unintelligible to those who did not understand all the steps.

In the cases stated, it appears there was no disturbance at the time of filling but at a subsequent period of shorter or longer duration of repose, in some cases two years, and in one, at least nine years subsequent to the healing process, diseased conditions announced themselves.

Scar tissue is always a grade below the original in life endowment, and often becomes the seat of disintegrating actions, because the debilitated organism is apt to relieve itself at the weaker points by issue.

This habit of the animal economy led to the doctrine not yet quite extinct in medicine and surgery of exhausting the constitutional cachexia through setons inserted for that purpose. The rule is to continue them until they exhibit strong tendency to heal, which is looked upon as testimony that the virus disturbing the nutrition of the system has become expelled from the body.

In our investigations of the pathology of such cases, (in fact all cases of disease displayed in circumscribed locality,) there are three points to be carefully considered, viz.: the *formation*, *nutrition*, and the specific *function* of the part.

If in place of chemically or mechanically removing the pulp it had obliterated itself by fulfillment of function, (this being simply tooth making,) by complete calcification, thus filling the canal to the foramen, the condition would not be pathological; but by the manual removal we induce the formation of scar tissue at the point of the root, and thus lay the foundation for trouble whenever the tone of the general system shall become so reduced as to fail to supply vascular and neural currents requisite to tolerance of the scar tissue in contact with the unchanged structures.

To enable us to apprehend these cases so as to treat them successfully, it becomes necessary to understand how the circulation is carried on in the comparatively large body and limb of the pulp in the chamber and canal of the root, through the infinitesimal opening at the point, which admits a single artery, vein, and nerve as source of the supply.

The only satisfactory method of accounting for the perfection of the supply of nutriment of so large a body through so very inconsiderable a channel, is to assume that the affinity subsisting between the exhausted cells and the plus charged arterial blood column continuously pressed into all the arterial system by the systole of the heart, taken together, constitute the force by which the circulation is so equably and admirably maintained.

So soon as the pulp is devitalized, this "cell-want" is annihilated, and hence one-half the power which supplied the blood stream is gone, just so far as the cells are killed. And we now have results varying with the degree of vigor of the systemic force. The most favorable result occurs in persons in good health, and consists in a case of pure atrophy in which the radicle artery, vein, and nerve are converted into scar tissue down to or near to their junction, with the branches of which they are but filaments, so to speak. So soon as the pulp in the chamber and root shall have been wholly removed by absorption, that which may properly be denominated "scar tissue" embraces the vessels and sheaths from the end of the root to the point of consolidation or induration adjoining the trunk of each.

The next most favorable result may be said to be conversion of the pulp proper to the foramen into pus, that remains permanently in situ, because of the conversion of the vessels and sheath with all its contents, as in the former case, into consolidated or "scar tissue." Neither of these conditions involve the periodontium, and hence are not prolific of abscess until in the lapse of systemic tone, inflammation may ensue as above stated in the cases which the gentlemen present. You ask how we may avoid such results as detailed in these cases which were so satisfactory for so long a time and then in the end proved so disastrous? Answer. In all cases where you are called upon to extirpate living pulps, the "sine qua non" to success is, first, to do the work as perfectly as possible, which in the vast majority of cases will insure against future trouble.

But where cases present with the pulps already dead by whatever cause and not well and securely filled to the very points of the fangs, take it for granted that there is mischief there, latent or active; cleanse out all foreign and all decaying matters and send up a fluid, (he uses creosote,) leaving the canal and crown cavity open for eight days, so as to let off any gaseous accumulations needing evacuation.

Then when you have thus proved it to be in fit condition, proceed to fill in the best manner, with the confident expectation that it is a success.

He had yet to see the first instance of a perfectly healed abscess which broke out again.

The scar tissue, when well formed, being of so low an organization in character that the agents which will readily act on the other tissues will not act on this for want of the requisite affinities to produce solution and disintegration.

Where it is necessary to cut through tender structures to open latent or active abscesses, chloroform and tinct. aconite very readily obtund the sensibility, and thus render bearable an otherwise almost unbearable operation.

Bathe the face external to the abscess with tinct. arnica, one part, water,

four parts, to prevent infiltration of serum in the loose cellular tissues so liable to extend the size and increase the severity of abscess when this precaution is not attended to.

In a word, if you desire to retain teeth in vigorous use from which the pulps have been removed, endeavor to keep the tone of the patient's health such that no infiltrations take place between the scar and primary tissues, and you need fear no loss of teeth so circumstanced.

November 30.

Subject—THE BEST MATERIAL FOR FILLING SIX-YEAR MOLARS BEFORE COMPLETE CALCIFICATION.

The essayist for the evening, Dr. C. S. Francis, taking it for granted that these teeth should, in a great majority of cases, be retained and kept in a state of preservation, inferred that it is a matter of no little importance that dentists should understand the best manner of treating them. Probably all of you, he said, at some period of your past dental experience have been sorely perplexed to know just how to treat low-toned six-year molar teeth. You find them decayed, and desire to save them. You have prepared them carefully for plugging, and have filled them as thoroughly as circumstances would permit, and yet have many times been disappointed at the result. You may have used gold, tin foil, or amalgam, or possibly the oxymur. of zinc. All these materials have sometimes disappointed you, and your operation has proved a failure. Suppose you try gold; the texture of the tooth may have been soft, affording a poor wall for the condensation or retention of the plug. The salivary glands may have opened their flood-gates and deluged your operation before half complete. The little patient may have become fatigued, or is naturally impatient, and the operator himself may perhaps have exhausted his stock of patience ere the plug is finished. You are hardly satisfied with your operation, yet have labored faithfully. You content yourself with the thought that, under the circumstances, you could have done no better. You cannot control the impatience of a child, nor the action of the salivary glands. You may stuff his mouth with napkins or wads of paper, and these only tend to gag him, and cause the saliva to secrete more copiously. In a great majority of cases the plugs must be repaired and extended at a future day, or be replaced by larger ones. Discouraged at your ill success with gold, you are tempted to try amalgam, but this does not meet your expectations. To be sure, it fills all parts of the cavity beautifully, and is quickly introduced. Indeed, there is something fascinating in the use of amalgam, but it is an uncertain stopping for a frail tooth. After a time it reminds us of a lump of charcoal in a bed of snow, and the snow appears to dissolve all around it. Don't say it is because the cavities are not thoroughly excavated. You have already cut them

sufficiently for *gold* plugs; you may continue to excavate and chisel until half the tooth is wasted, and the result will almost invariably prove the same. You try tin foil with a *little* better success. It is softer and more pliant than gold, and is more quickly and easily packed. Its adaptability to the frail walls of an imperfectly calcified tooth is more complete than either gold or amalgam, yet it is not all that we could desire. Like gold, it requires too much time for thorough condensation. You try Wood's metal; it may answer a good purpose in some cases, but not in all. Where there is an excess of saliva, the metal works badly, and the uneasy, restless little tongue is apt to get burned, as also the lips and cheek. The high temperature required for using this material is sometimes too great for the benefit of the dental pulp, or the sensibility of the patient. Perhaps you have resorted to the "osteoplastic," or zinc filling. Like amalgam, this is easily and quickly introduced, and it presents a neat white surface. For a very brief period of time it works well, but soon dissolves or wears away, consequently proves a failure.

A material suitable for filling young children's teeth should possess several superior qualities. It should be capable of rapid manipulation, requiring but little force in its introduction; impervious to the penetrating action of saliva or ordinary acidulated fluids; sufficiently hard to afford a good surface for mastication; a substance that will neither shrink nor oxidize, and which will not fail to protect the walls of the cavity against further encroachments of disease. In short, we want the best materials for keeping a young child's tooth in the most perfect state of preservation until its substance becomes more compact or better calcified.

The best material that I have ever been able to find for this purpose is known as "Bevin's Artificial Dentine," a plastic filling very similar to "Hill's Stopping," and composed, I imagine, of gutta-percha and ground silix. This, I believe, possesses the *greatest* number of good qualities, and presents the *least* number of objections. It requires but a slight degree of heat to render it sufficiently plastic for use, and can be quickly introduced into the cavity prepared for its reception; it neither shrinks, discolors, nor oxidizes. The fluids of the mouth will neither dissolve nor permeate it. It expands a trifle, just sufficient to hug closely against the walls of the tooth, and, if the cavity is properly prepared, you never need fear an extension of the decay around or beneath the plug, neither will the plug crumble or fall out. There is but one objection of any note that I can conceive of. If the cavity is large and on the grinding surface, and much service is required of the tooth, the filling will, by the constant attrition, slowly and gradually wear away; yet, even in this case, the walls of the cavity are well protected until the plug assumes a deep concave appearance. This objection amounts to but little if the patient's teeth are examined once or twice a year, and that is seldom enough under any circumstance. It is a trifling matter to add a little filling, or to renew it

entirely if necessary. I have seen plugs of this material that have perfectly preserved the cavities in which they were placed five, six, and nine years, without ever having been renewed. I think this speaks well for a temporary plastic filling. When a tooth thus filled has become well calcified, and the texture as dense and compact as you desire, you have simply to remove the temporary plug and introduce the permanent one, which should be of pure gold foil, well consolidated under the telling influence of the indispensable "mallet."

Dr. G. E. Hawes thought he could save some of these teeth with other materials than that mentioned by the essayist; he knew such which had been filled twenty-five years, and it did one good to see the results of his own work sometimes. He filled with gold or with tin foil, just as he felt at the time was best. He hoped no inquisitive gentleman would ask how he knew which to use, for he could not tell how, he could only feel it at the time. We cannot forestall results in operating on these teeth.

Dr. Mills said no subject interested him more than the filling of six-year molars. He had long felt it wrong to extract them, and had paid much attention to saving them. They are the most trying cases of any, requiring the greatest care and most skillful management. He was very much pleased with Bevin's stopping, and felt that it would wear for years; he considered it a providential thing for troublesome children, that would preserve the teeth to an age when gold could be used. He had seen some of Dr. Francis' work of this kind, and would defy any one to have put in gold under the circumstances; and yet these plugs had answered perfectly.

Dr. J. S. Latimer believed that Bevin's was the same as Hill's stopping, only better prepared. He had seen a plug of Dr. Allport's, made during his pupilage, of Hill's stopping, which had done service for eleven years. He (Dr. L.) had prepared precipitated chalk and pulverized gutta-percha for use in temporary operations, where it answered very well, and was much less expensive. He kneaded into the gutta-percha as much of the chalk as it would take up.

Dr. Wm. H. Allen being called on, said that he did the best he could with six-year molars, and always used gold if possible, but there were cases that would tax all the dentists and Job; in such it was not easy to say what was best,—that depended on many circumstances. He thought Bevin's and Hill's stopping good for a temporary purpose.

Dr. Royce used Bevin's stopping in temporary teeth, and for a temporary purpose in permanent teeth; also where the pulp was nearly exposed he introduced a layer of it before the metal.

Dr. Atkinson. That agent is doubtless the best which will preserve the vitality of the tooth; the question is, have we discovered the one which is always best? We are much at fault in the use of the term "complete calcification." It is not attained when the fang has reached its full

length; nor when secondary dentine begins to diminish the size of the pulp chamber. He did not consider the process complete until the pulp cavity was obliterated by being filled with bone. A tooth is perfect when calcification has proceeded as far as is compatible with the life of the pulp. He would by all means preserve pulps till the maturity of the patient. He had seen very poor teeth that would cut like chalk, made as hard as enamel by constitutional treatment with lime-water. The teeth of Europeans were often so thoroughly calcified as to be extremely brittle.

Dr. Franklin said it was indisputable that teeth could be sometimes saved with tin foil when they could not be with gold. He accounted for this by supposing that there was a greater degree of affinity between the tin and the acidulous walls of these teeth; which was evinced by the blackening of the surface of the plug.

Dr. C. P. Fitch said that if we had a typical form of tooth, the best fillings would be those which would exclude everything. We should be able to judge from constitutional indications what kind of teeth we had to deal with. Six-year molars are the most sensitive, but if we save them up to a certain time they will harden by taking in more lime; then we get an improved condition. We must take the broad ground of treating patients with a view to the development of their teeth. The filling of six-year molars requires the preparation of these teeth by constitutional treatment, *then* fill them and they may be considered safe.

Dr. A. C. Hawes used gold in almost all cases, and thinks tin foil next best; it is the favorite material with him for temporary teeth, and he considers it more durable than anything else except gold. When children are troublesome, he uses sufficient chloroform to control them without producing insensibility.

Dr. Hurd said that he sometimes felt like wishing there were no six-year molars, and as though we were born wrong end foremost, with perishable organs of the value of which we have no idea. To fill these teeth we must use all our tact—and sometimes one material and sometimes another; when there is a flood in the mouth, he was very glad to get in Hill's stopping. He made a good gold filling when he could, but thinks the results are due more to the manipulation than to the material. The six-year molars can be saved when you have a good patient, are in good trim yourself, and do the work well.

Dr. Marvin uses Hill's stopping for temporary purposes, or for covering medicines in teeth. He has no different practice in treating six-year molars than any other teeth; often filling them temporarily, until later years produce better conditions. He has used many large tin plugs with satisfaction. The great fault lay in parents considering these to be deciduous teeth, and so they come to us in an advanced state of decay, and we must use what we think best. He does not have more difficulty in saving these teeth than others in a like condition.

Dr. Fitch always filled a tooth with that which he thinks will produce the most perfect results, and reserves to himself the right to judge what is best under the circumstances.

Dr. Hurd recommended the oil of thyme for allaying sensitiveness in dentine. He had found it very useful, in children's teeth especially.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

REPORTED FOR THE DENTAL COSMOS BY R. J. HOFFNER, D.D.S.

A MONTHLY meeting of the Odontographic Society was held Tuesday evening, January 3d, 1865, at the Philadelphia Dental College, President Dr. C. A. Kingsbury in the Chair.

Written communications being in order, the Corresponding Secretary stated that he had received a letter from Dr. A. C. Hawes, of New York, the essayist of the evening, regretting that his recent indisposition had prevented the preparation of the paper which he had anticipated sending. In the place of the essay, the following communication was read, upon

"NON-SECTIONAL BLOCK-WORK."

BY JOHN W. MOFFITT, OF HARRISBURG, PA.

In glancing over the past, none can help remarking the multiplicity of forms that, from time to time, have been adopted, and had their day in mechanical dentistry, in that branch pertaining to the manufacture and mounting of artificial teeth. True, at the very outstart single teeth with gold and silver, as a base, were adopted without much hesitation or argument, simply because incorruptibility and strength were patent in their very natures. Upon this account, they have kept pace and company with the profession, in all its advances and vicissitudes, to the present. While at first we were convinced that they were good, and satisfied with them as a reliable base, there were other great ends to be attained, which it was impossible to combine upon gold and silver with single teeth. These objects were adaptability, cleanliness, symmetry, and comeliness. Last, though not least, to secure the requisite strength with these desiderata. Now, while the majority feel well convinced that no base for artificial dentures can supersede the use of platina and gold, yet almost daily some new-fangled theories are foisted upon the profession, and as promptly, liberally, and faithfully tried as they are presented. The failures, at the practitioner's expense, have been frequent enough to convince the most skeptical observer or ambitious theorizer that platina and gold have not been and are not likely to be dethroned. But the object of this paper is to call your attention to a style of artificial dentures mounted on a platina base, known as "Non-sectional Block-work," in which I claim to

have combined the desirable requisites before alluded to. The nature of this work consists in the manufacture of teeth and gums, in one solid and homogeneous mass, upon a platina plate which has been fitted to the mouth of the subject, of the materials which I shall hereinafter specify. The formulas I am now using will be found to differ somewhat from those I had patented in 1860. To be brief, I will first proceed to give a list of materials used; second, the proportions of these required for body, enamel, etc.; third, the manner of manipulating them to produce the final result, "non-sectional block-work."

First. The materials used are spar, silix, Bohemian glass, white French china, and, for coloring matter, titanium, platina sponge, and purple of Cassius.

Second. I take for *No. 1 Body*, spar, 12 ozs.; silix, 4 ozs. 6 dwts.; Bohemian glass, 45 grs.; French china, 30 grs.; titanium, 36 to 56 grs., as the color desired may render proper.

For *Body No. 2*, use body *No. 1* fused and ground to an impalpable powder.

For *Blue Enamel No. 1*, spar, 4 ozs.; Bohemian glass, 2 dwts.; platina sponge, from 1 to 5 grs.; gold mixture, 5 to 10 grs.

For *Blue Enamel No. 2*, take of *No. 1* enamel 1 oz.; add 9 grs. Bohemian glass, and *grind very fine*.

Yellow Enamel made same as *No. 1* blue, omitting the platina sponge and substituting titanium, 40 grs.; gold mixture, 20 grs.

Gum Enamel is made from a frit, composed of purple of Cassius, 8 grs.; Bohemian glass, 11 dwts. 11 grs.; spar, 20 dwts. This is ground to impalpable fineness and packed into a crucible lined with a batter of silix. Lute a piece of fire-clay slab into the top. After it is dry, place it into the muffle of a furnace heated sufficient to fuse spar, for the space of fifteen or twenty minutes, after which grind fine and add $2\frac{1}{2}$ dwts. spar, and $2\frac{1}{2}$ dwts. Bohemian glass. Grind the whole very fine, and fuse to vitrification in an open crucible in the muffle of a furnace. This will produce the frit ready for making gum enamel; for making which take of frit say 1 dwt., Bohemian glass, 2 dwts., or in proportions to produce the proper shade of gum color.

Thirdly. After the plate is properly fitted, the articulation obtained, and matrix provided and applied to the plate, as for ordinary block-work, take a sufficient quantity of *Body No. 1*, mix it to a thick paste, and, after oiling the matrix, pack it into the latter, tapping it with the finger to drive out any confined air. After the body is *packed in solid*, proceed to carve the teeth. After the exterior portion of the teeth and gums are carved, remove the matrix, carve the crowns and lingual parts, and, before covering the palatal portion with body, enamel the teeth, by first mixing the enamels to consistency of cream with *soft water*, and laying on the yellow first at the neck of the tooth with a camel's hair pencil.

Then the No. 1 blue is applied so as to overlap the yellow, and reach down over the cutting edge of the teeth. (This coming down of the enamel over the cutting edge will make sufficient allowance for shrinkage in length.) After the enameling is completed, and the teeth trimmed to the desired shape, proceed to cover the palatal portion of the plate with body No. 1, and carve, imitating nature as closely as possible.

The carving and enameling completed, the piece is ready for the baking process, which is accomplished by imbedding it in silex sand, in a slide or tray, the edges or rim of which should be from one-half to an inch in height, and allowing the sand to fill the palatal portion and cover all parts of the body, except the teeth or the parts enameled. It should then be introduced slowly into the muffle of a heated furnace. After it has come to the point of fusion, which requires from ten to fifteen minutes, it should be withdrawn and allowed to cool. Should there be found any imperfections in the piece, they must be remedied by applying No. 2 body to those which may be found in the body, and No. 2 enamel to those which may be found in the teeth; and then bake in the furnace as before. After the piece has again cooled it will be found perfect, and ready for the gum enamel, which is applied with a camel's hair pencil, in the usual manner; after which the piece is placed upon a slide, and introduced very slowly into the muffle of a furnace, allowing the heat to come upon it gradually, until the enamel flows, when it is withdrawn, placed in a muffle previously warmed, and allowed to cool; it will then be found that it has undergone scarcely any appreciable change in either length of teeth or form of the curve, and will be entirely free from the liability of cracking, shelling, or breaking from exposure to sudden changes of temperature, as taking it from the mouth while warm and placing it in cold water, or from extremes of heat and cold while in the mouth.

I have thus, gentlemen, endeavored to give you a description of the manner of producing this work, and hope those of you who may feel inclined to give it a trial may find it as valuable to yourselves, and as satisfactory to your patients, as I have.

(To be continued.)

NEW YORK SOCIETY OF DENTAL SURGEONS.

REPORTED PHONOGRAPHICALLY BY F. M. ODELL.

Wednesday, April 6th, 1864.

Subject—MECHANICAL DENTISTRY.

At a meeting of the New York Dental Association, held at the Cooper Institute, on the evening of the above date, after the reading of an essay by Dr. Latimer, and a paper by Dr. Atkinson, the members proceeded to the discussion of the subject for the evening, Mechanical Dentistry, as follows:—

Dr. Franklin desired to explain one point that was raised at the last meeting, viz.: Dr. Castle asked, why there is a space left between the back of the plate and the roof of the mouth? In reply, I would say, there are two things which operate to produce it. First. If, in taking the impression, the plaster is very thin, it may sag down from the arch of the mouth, and thus produce the difficulty. The sagging occurs, of course, before crystallization takes place. Secondly. Plaster expands *laterally*. The crystals of plaster, when seen by a microscope, are seen to stand up and down. The expansion of plaster is equal to thirty pounds to the square inch; sufficient to draw any plate out of shape. Have known many a good plate to be spoiled by the expansion of the plaster cast. This expansion of the plaster cast would, of course, draw the plate down in the centre.

To a question, Whether the expansion arose from the plaster impression or the model? Dr. F. replied, when the impression is taken with wax alone, the expansion of the model will be quite sufficient to cause the difficulty.

To another question, Why does every one get such beautiful fits with rubber-base, if there is so much trouble with the plaster? Dr. F. replied, the rubber works absolutely into the pores of the plaster, thereby virtually reducing the size of the cast.

Dr. Castle does not think that the expansion of the plaster is enough to cause so much difficulty as has been ascribed to it. Had read of a series of experiments published by Dr. Franklin, and tried some for himself, and in one case, filled an egg-shell with plaster and found that the plaster had diminished. The difficulty spoken of is owing to the velum being drawn down during the act of opening the mouth.

Dr. John Allen said, one other difficulty with many who use a zinc cast is, the counter-model is made with too much plaster, thereby increasing the expansion.

[If Dr. Franklin is right in relation to the plaster expanding laterally, and *only* laterally, how can plaster increase the expansion, if it be piled up ever so high?—REP.]

Dr. J. Allen continued, if we take a metal which has an undue contraction, we cause the difficulty in question in making our dies. If you strike up your plate on a zinc die, the plate will strike on the sides and not go up into the centre of the mouth or model; but by combining your metals, so as to have your die as large as the plaster cast, you avoid the difficulty. I use a combination of antimony, zinc, and tin; do not recollect the exact proportions, but the product is a combination in which the contraction is very small. The ridge of the gum is generally harder than the roof of the mouth, and will not let the plate up; if the roof of the mouth should be harder than the ridge, then you have undue pressure on the centre.

In answer to a question, the doctor replied, this occurs when the plate is taken from the die. The difficulty is in the die.

Dr. Franklin explained that plaster expands laterally, and only laterally, and in proportion as you expand a plate, you draw it down from the centre.

Dr. John Allen said, another good compound is copper, tin, and bismuth; mould in sand. Too much antimony will not let the die shrink at all. Metallic dies do not shrink perceptibly, if taken with either of the compounds mentioned.

Dr. Castle thinks that what prevents the plate from fitting the palatine arch is, that the contraction of the zinc is greater than the expansion of the plaster model.

Dr. Latimer said, beeswax, when used to take an impression, (when unconfined at the back of the cup,) will roll out like a rose; this would account for the imperfect impression at the velum; but if you fill up with plaster at the back of the cup, so as to leave no place for it to roll out, the impression will be perfect. The tendency of wax is to curl out and form a circle. If your impression does not expand with the cast, there will be a space left at the palatine arch, between the model and the impression. When an impression has been taken with accuracy, if you make a back to the first impression, and filling up again take the impression over, it will have a tendency to set back against the gum, and will consequently give an accurate copy of the arch.

Dr. Kingsley has never seen any rolling or curling of plaster at all. Had used plaster so thin that it will just stay on the knife, just so that it would not run off, and it will stick where you put it—it will stick to the velum, the gums, etc.; it does not drop away, but sticks wherever it touches; if it runs down the cheek, it will stick to it. I try to bend the impression-cup into the form of the gum, and there is no possibility of the plaster curling; it will be a perfect thing. Agree with the views of Dr. Allen; and believe the main cause of the difficulty complained of in metallic plates, to be the undue shrinkage of the dies, etc. But I do *not* believe that the expansion of the plaster makes so much difficulty as has been talked of; in a large majority of cases, it is merely splitting hairs. In my own practice, use zinc dies, but use a male model of type-metal, and in plain cases frequently have the plate to fit over the cast as if it had been made over it. If the ridge of the plate is very bold, never attempt to put it on to the plaster cast at all. Plates which pinch, I bend out a little, and this will let them up to the palatine arch. Used to carve the male model sometimes, and swage the plate over again. Make casts of (3) three parts zinc and (1) one part tin. In most every case where *my* plates would not go up right, was satisfied that the plate was resting on the hard bone while the gums were yielding. For all manner of impressions, I like plaster best; it will not require any wax behind it

to support it. Do not believe you could find sufficient clean wax about my premises to take an impression with; I use plaster exclusively.

Dr. Crowell said, I have a little to say on clasps. One gentleman said that he fitted his clasps by bending them first lengthwise of the clasp, then, with a pair of common instruments made for that purpose, AROUND the tooth, etc. It is *impossible* to fit a clasp to a tooth by bending! The man does not live who can fit a clasp in that way! Go into a machine-shop, and they will tell you that it is impossible to fit a collar of wire around a spherical bar of iron. But by taking a piece of platina, rolling it as thin as thin paper, and wrapping this around the tooth, you can flow gold over it, and so get a fit which will be accurate. The platina must be rolled very slowly, because if done quickly it crimps; cut in very narrow strips, wind it around the tooth, and flow solder over it. Or, take an impression of the tooth, saturate with wax, coat with plumbago, and take it to an electrotyper, and it can be done in two hours' time.

In answer to an objection raised by one of the members, in regard to the benefit or desirableness of getting an exact fit to the tooth, Dr. C. replied, that that was an entirely different question, whether there is any advantage in having the clasp perfectly adapted to every part of the tooth; the gentleman having stated that he got a perfect fit by bending, I merely wished to show, first, that it was not possible to do it in that manner, and, secondly, how it *was* possible to do it. Its desirableness I leave to other hands to determine upon.

Dr. J. Allen, in reply to Dr. Crowell's remarks on electrotyping, said, a novice could not do it in the way pointed out by Dr. C. There is one difficulty in the way; with silver plates it may be done, but with gold not so easy. With gold the process is much slower—the gold will not stick to the plumbago; but if you take foil, you can deposit the gold upon that; but to throw it down upon the plumbago is very difficult. Another difficulty is, the *time* required, which is too great. If the solution be kept hot, and the battery be worked rapidly, in order to shorten the time, the deposit will not be as tough as when it is done slowly. A silver plate could be done tolerably quick. I used the battery at one time considerably; but, in consequence of the great amount of time required, have abandoned it.

Dr. Atkinson said, a cast made of zinc, in intelligent hands, does not change by shrinkage, when used not to exceed five meltings. If you keep jostling the hot zinc, and at the same time hold the hot ladle over the centre of the cast, you get all the shrinkage at the centre of the top of the cast. There is no necessity for making the clasps fit exactly; indeed, it is impossible. Philosophers tell us that there is no absolute contact, even between molecules. In regard to this matter of expansion, if you use plaster to take the impression and plaster to make the model,

you get compensation. The plaster ought not to be left two hours before making the metallic die; but it makes no difference what the method may be, so long as a good result is obtained.

Dr. Franklin said, I would like to know how a man *knows* when he obtains a good result? He can know when his work is as good as in former operations; but what is to be the gauge of good results? A good impression can be obtained with wax. Plaster *expands always* at the ordinary temperature of the atmosphere. If you have very fine plaster, and let it absorb the water very thoroughly before using, then fill the model with plaster and sand, or plaster and silex, you get very little expansion.

Dr. Fitch said, I regard mechanical dentistry as one of the basal subjects of dentistry. So far as impressions are concerned, we should understand the materials we use, and the peculiarities of the subject to be acted upon. I would not proceed in the same way in all cases: if we have a soft and hard mouth, what we might call a variegated-mouth, we must adapt our manipulations to meet the emergency—every one knows how to manage such cases. The most of the unfits arise from imperfect manipulations, generally in taking the impressions. I do as well with wax as with plaster; I mean with wax alone. In taking the impression for variegated-mouths with wax, would first press the warm wax up to obtain the impression, then dip into cold water to chill the surface of the wax, put back into the mouth and press up again, holding it there firmly until it hardens. Chill only the surface of the wax, to make it define the rugæ of the mouth more perfectly. Do not chill it so hard as to defeat the end in view; soft wax does not go up into the depressions good. Find that the expansion of the plaster is not sufficient to produce all the unfits that are charged to it. For lower partial cases, use plaster, same as Dr. Kingsley. In some cases I trim up the male model where necessary. In reference to zinc, a zinc die will always have a shrinkage, and you do not get a fit in consequence, and the plate when struck up impinges upon the ridge, and consequently cannot go up to the centre of the arch. Antimony in the zinc will prevent the shrinkage. I generally get a fit when the antimony is used with the zinc. Agree with Dr. Atkinson, that if the result is right, *everything* is right.

Dr. Burras said, am an advocate of wax! Always for *full* sets try to obtain the impression with plaster. Use plaster for the impression, and obtain the model as soon as possible. For partial cases, believe in wax. Think that the dentist should give his patient some little instructions before proceeding to take an impression; I direct my patients to breathe through the nose, and to sit in an upright position. When a person opens the mouth, he will naturally breathe through the nose. Have taken an impression in an upright position, and come to try in the plate, the patient sitting way down in the chair, on the small of the back,

the plate would not fit. But on restoring the patient to an upright position, the fit seemed to be good. With reference to wax, it is useless to attempt to take a *perfect* impression with that alone. It is necessary to control the roll of the wax as far as you want the impression to be perfect.

Adjourned. Subject to be continued.

NEW YORK SOCIETY OF DENTAL SURGEONS.

November 23, 1864.

BY DR. W. C. HORNE.

"FILLING Teeth" being the subject for the evening, the president, Dr. Hurd, on being called upon, briefly recapitulated the usual steps in filling with adhesive foil as practiced by him. Using Wood's metal he thought was but a return to fusible metal, which was tried and condemned many years ago. He considered a good amalgam plug much better.

Dr. Robbins could not agree with the president's views. He thought Wood's metal much better than amalgam; it did not shrink, while he never saw an amalgam filling that did not. It is troublesome to use, very small pieces of it must be put into the tooth at a time. He had known a tooth to ulcerate after being plugged with it, but that was because the metal was too hot when inserted. Altogether he was much in favor of it, and thought it wore better than tin foil.

Dr. Mills remarked that most of the trouble with Wood's metal arose from injudicious use; the fact was that it was applied too hot. He had had great fears of this at first, but now can fill with confidence; and has just as much satisfaction in fillings of this kind as in any others. He thought it wore well.

Dr. John Allen would like to know whether there was any real advantage in washing the walls of a cavity with creosote before filling. If we look back on the work of our best operators for twenty years past, we will find numbers of teeth well filled, and doing excellent service at the present day, where washing with creosote had not been a prerequisite to the insertion of the plug.

Dr. Atkinson had advocated the use of creosote in this manner so long that he had supposed it was settled as an axiom that it should be so used. He thought it had a soothing effect on tender teeth for many days, saving them any shock after the plugging. His experience tallied with this; he had yet to find the first case of shock after using it. His practice was to saturate a pellet of cotton with creosote and lay it in the excavated cavity, allowing it to remain there while another tooth was being prepared; or, failing that, five minutes will do the work. He is always sure then that

he has left a friend there; the excess is sometimes tasted for months—in one case he had on record for fifteen months.

Dr. Fitch said there was one practical point he would like to impress on the members; if the bill was paid, the work was much more likely to be satisfactory to the patient. He did not think there was much choice between a good amalgam and Wood's metal; the great trouble lay in the slovenliness with which they were both often used. Prepare the cavity well, keep it dry, and finish well, and either of these materials will make good plugs. Unless amalgam fillings are carefully washed the oxides of the metals are deposited on the walls of the tooth, which cause their disintegration.

Dr. Latimer had remarked a yellow deposit underlying plugs of Wood's metal; he would be glad to hear if any one could explain what it was. He had a plugging instrument to which he would call attention. It was foot shaped, with two rows of fine sharp points, deeply cut, and very narrow. He found it exceedingly useful in finishing a plug, or where there was something of an undercut.

Dr. Atkinson said the yellow deposit was the oxide of cadmium, that being one of the ingredients of Wood's metal.

Dr. Horne doubted its being the oxide of cadmium, as he had seen the same thing under both gold plugs and Wood's metal.

Dr. W. H. Allen found a class of cavities very difficult to fill; they were small approximal cavities. He liked crystal gold best for them, as it did not come away with the instrument. He had used this form of gold in large cavities, but did not prefer it there, while for these minute cavities it is just the thing. Good amalgam will wear longer than anything else. He preferred Wood's metal in some cases. Of all amalgams he called Lawrence's the very best. As to the use of creosote, soaking the tooth with it lessens the sensibility; of its permanent good effects, he was not able to speak.

EDITORIAL.

SENSITIVE DENTINE—ARSENIC, AND THE TREATMENT OF THE DENTAL PULP.

It is not worth while to say much more on the treatment of the dental pulp and sensitive dentine, but it must be borne in mind that as deadly a poison as arsenic cannot be applied to the teeth with impunity. A tooth is vital, and it can be killed if too much arsenic is applied to the dentine. It must not be left long enough to soak through the stratum of bone until it reaches the pulp, as it will inflame it; experience will soon teach any one this who has a proper idea of the permeable character of the tooth substance; and when the sensibility of the dentine is destroyed, cut away as much as possible of the bone that is insensible,

so as to remove all the arsenic which it may have absorbed; because if arsenic be left in the dentine below the plug, it will pass on to the pulp and inflame it in a few days after the tooth is plugged. It is not well to apply the arsenic too often, even if the part still seems to be sensitive, as enough may have been absorbed to kill the part sufficiently to excavate the cavity, if a little time is allowed. Some teeth do not yield to the effects of arsenic as rapidly as others, and still enough may have been applied. Sometimes the first application seems only to have increased the sensibility of the part; but waiting two or three days the tenderness will subside and the cavity can be prepared; if not then, it will be safe to apply it again. The arsenic should generally be applied around the surface of the cavity, immediately under the enamel, as it will destroy the tenderness of the enamel membrane, which, as a rule, is sufficient. It would be well to remark here, how can this fact be explained if the presence of nerves in the part be not acknowledged? Besides, it is desirable to keep the arsenic as far from the pulp as possible. I have been treating the teeth of a young gentleman for some years, which decay along the margins of the gums, a kind of run-round decay, which is very white and exquisitely sensitive. He is of the nervous-sanguine temperament, and cannot resist pain. There have been from three to five plugs put in all of his front teeth, and in no case has any former plug been removed; the decay spreads from the plugs and is always highly sensitive. The old plugs form a part of the walls of the cavities of new plugs, and with this frequent application of arsenic, no one of the pulps have become inflamed. This, of course, shows that arsenic may be applied for years to a tooth, providing care is observed, and the tooth still retain its vitality unimpaired. In applying the arsenical paste to a pulp, it may be allowed to remain for twenty-four or forty-eight hours, and then the dead portion of the pulp should be removed, so that the arsenic it has absorbed may be removed also; if not, the arsenic in the dead pulp will pass through the foramen at the end of the root as well as through the walls of the pulp cavity, and inflame the external membranes. It will also kill the bone of the tooth, and that will be sufficient cause for inflammation of those membranes. The vitality of the whole tooth must be preserved as much as possible, or periostitis will sooner or later supervene. The application of the paste can be of no other use than to enable one to remove the pulp without pain. It is impossible to conceive how any one can let a poison remain in a tooth for weeks, as some do, and hope to save it from future trouble. If a portion only of the pulp is removed at a first effort of the application of the paste, it is hardly good practice to apply it a second time without waiting a day or two, until the bleeding subsides, as the blood will prevent the paste from acting on the living remnant of the pulp, and, of course, it will be absorbed by the tooth and help to injure it. About the propriety of removing all of the

pulp and blood-vessels from a tooth to the very apex of a fang, I spoke long ago. Each one seems to entertain his own notions about it; but it is hoped that sufficient has been said to defend some of the objections to the use of arsenic in the treatment of sensitive dentine and the dental pulp.

J. D. W.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

BRITISH JOURNAL OF DENTAL SCIENCE—OCTOBER.

“ON THE GROWTH OF THE JAWS. By G. M. HUMPHREY, M.D., F.R.S. (From the ‘Transactions of the Cambridge Philosophical Society.’)—Analogy leads us to suppose that the enlargement of the jaw-bones is effected, and their proper shape given and preserved, mainly or entirely, by addition at some parts and subtraction at others, there being little or no interstitial growth; and the disposition of the teeth and the changes which take place during second dentition, as well as the position of the additional teeth of the second series, and a comparison of the arch of the lower jaw at different periods of life, are confirmatory of that view.

“In the lower jaw the five anterior permanent teeth, on either side, are formed below and behind the five deciduous teeth—the two permanent incisors beneath the two deciduous incisors, the permanent canines beneath the deciduous canines, and the bicuspid beneath the deciduous molars. As they ascend they advance a little forward into the places of the deciduous teeth. The permanent incisors and canines, being larger than their predecessors, occupy rather more space, and extend a little beyond the range of the deciduous canines, so that the permanent canines encroach somewhat upon the territory of the deciduous molars. This is, however, compensated for, and room is afforded, by the size of the bicuspid not quite equaling that of the deciduous molars. The third molars of the child, which are also the anterior molars of the permanent series, and which are formed immediately behind the hinder deciduous molars, retain their position throughout life; and the alveolar arch between them, in which the ten deciduous teeth and their ten successors are placed, undergoes very little alteration of size or shape after birth. Even while the two halves of the jaw remain separate there is very little growth at the symphysis; and after they are ankylosed, which takes place between the sixth and ninth month after birth, the growth at this part seems to be entirely arrested.

“True, there is some apparent difference of opinion on this point. Bell,* comparing the jaw at seven years with the same jaw at twelve or fourteen, finds that ‘the ten anterior permanent teeth occupy a somewhat larger arch than the temporary ones which precede them do;’ and Dr. Hermann Welcher† represents the transverse distance between the first two permanent molars to be rather greater, and the width of the alveolar arch to be also rather greater in the adult than in the child. Whereas Hunter‡ finds

* On the Teeth.

† Untersuchungen über Wachsthum und Bau des Menschlichen Schädels, p. 11, and Taf. III, fig. 6.

‡ Works by Palmer, II. 48.

that 'the jaw does not increase in length between the symphysis and the sixth tooth after the bodies of the sixth teeth are pretty well formed; and from this time, too, the alveolar process, which makes the anterior part of the arches of both jaws, never becomes a section of a larger circle, whence the lower part of a child's face is flatter, or not so projecting forward as in the adult.' The fact is the part of the arch of the jaw which is first formed, viz., the part intermediate between the alveolar and the lower edges, retains its original curve, undergoing no alteration of form; but as the bone increases upward and downward the new part is, in each direction, and more especially below, thrown a little outward, that is, into a wider curve. Slight additional space is thus afforded for the teeth, and a convex vertical outline is given to the hinder surface of the jaw. In the European jaw the projection of the alveolar part is very slight, that part and the teeth being nearly vertical, whereas the lower or mental edge is thrown out considerably, giving a marked prominence to the chin. In the Negro the mental projection is less, and the alveolar projection is greater; and in the monkey and other inferior animals the alveoli become thrown out into an arch extending far beyond the range of the jaw at birth, but the chin remains suppressed to its original curve or nearly so.

"In the upper jaw, the relations of the several primary teeth and their successors to one another is the same as in the lower jaw; but the enlargement of the alveolar arch by extension outward, during its downward growth, is somewhat more marked. Hence the alveoli and the teeth acquire a more oblique direction; and hence the incisors and canines project in front of their opponents in the lower jaw, so as to admit the cutting edges of the lower incisors to be drawn up, scissor-like, behind the edges of the upper incisors, when the jaws are approximated.

"The additional teeth of the second dentition (the two hinder molars on each side) are placed behind those of the first dentition, in a line which is a continuation of the alveolar line of the infant. This is shown by placing an infantile jaw upon an adult jaw, so that the alveoli of the two correspond; for the permanent molars of the adult are then seen to be in the same line with the temporary molars of the infant.

"Hunter observes that 'the jaws lengthen only at their posterior ends; so that the sixth tooth, which was under the coronoid process in the lower jaw, and in the tubercles of the upper jaw of the foetus is, at last, viz., in the eighth or ninth year, placed before these parts; and then the seventh tooth appears in the place which the sixth occupied with respect to the coronoid process and the tubercle; and about the twelfth or fourteenth year the eighth tooth is situated where the seventh was placed. At the age of eighteen or twenty the eighth tooth is formed before the coronoid process in the lower jaw, and under or somewhat before the tubercle in the upper jaw.'

"The only mode in which we can conceive the lower jaw to be thus elongated is by a gradual absorption of the fore part of the coronoid and condyloid processes, and a gradual addition to the hinder part of those processes, as well as at the angle and along the hinder edge of the jaw. In this way the coronoid process, which is at first situated over the rudiments of the permanent molars, may become shifted to a plane behind them. That this is the change which actually takes place has been inferred

by some physiologists,* and is proved by the following experiments which I made during last summer :—

“In a pig, ten weeks old, a hole was bored through the ramus of the lower jaw, midway between the fore and hinder edges; and two wires were passed through it and secured, one encircling the anterior or coronoid portion and edge, and the other the posterior or condyloid part. After a month the pig was killed. The loop of the anterior wire was found projecting a quarter of an inch beyond the coronoid edge, showing that the bone had receded in that situation; whereas the loop of the posterior wire was buried more than a quarter of an inch deep in a notch in the condyloid part, showing that the bone had advanced in this direction, and to a greater extent than it had receded from the front.

“In a pig, thirteen weeks old, a wire was placed round the left ramus of the lower jaw, encircling it entirely, and, of course, including the anterior and the posterior edges. Two weeks later a wire was passed through a hole bored near the anterior or coronoid edge of the right ramus, and secured round that edge; and a second wire was passed through a hole bored near the hinder or condyloid edge, and was secured round it. After three months the pig was killed.

“On the left side the loop of the wire projected half an inch or more beyond the coronoid edge; whereas, behind, it was buried in a deep notch in the condyloid edge, so deep that the head and angle of the bone reached (had grown) to a plane more than an inch behind the wire.

“On the right side the anterior ring of wire was found in the tissue in front of the ramus, and fell from it, having been disengaged by the absorption of the bone in this situation. Slight thickening and unevenness of the edge of the coronoid process mark where it laid. The hinder ring was still held in place by the portion of bone which it encircled. It was nearly an inch from the hinder edge of the jaw.

“I have already remarked that the additional molars of the permanent series grow up, on either side, in a continuation of a line formed by the primary teeth. Hence, though the bones of the alveolar arch are extended backward, and the arch is rendered more elliptical, it is not widened. The widening of the jaw, in correspondence with the increasing width of the base of the skull, takes place almost entirely behind the alveolar arch, in the ramus, and must be effected by a progressive absorption on the inner surface, and an addition at the outer surface, similar to the absorption and addition that are taking place, respectively, at the coronoid and condyloid edges. Accordingly we find that, in infancy, the rami of the jaw are in a line with the alveoli; whereas, subsequently, they diverge considerably, and a well-marked obtuse angle, in a horizontal plane, is formed on either side, between the alveolar arch and the hinder portion of the jaw.

“The gradual diminution of the angle between the horizontal portion of the jaw and of the ramus, from an almost straight line to a right angle,

* Mr. Tomes, whose excellent account of the development, disposition, and cutting of the teeth was unknown to me when this paper was read, describes the growth of the jaw as taking place in this way, and states, *System of Dental Surgery*, p. 117, if a transverse section be taken from the base of the ramus of a growing jaw, it will be found that indications of absorption are presented at its anterior edge; and at the point corresponding to the posterior edge of the jaw evidences of osseous development are present.

which is, partly, for the purpose of affording vertical space for the molar teeth, is effected by absorption at the base of the coronoid process in front, and addition at the 'angle' behind. These changes are most marked in the European members of the human family; and it is, probably, a consequence of these changes, and of the smallness of the angle in which the hinder molar or wisdom tooth is developed, that it is liable, in its growth, to intrude upon the mucous membrane in front of the coronoid process, causing irritation of it, and so imposing some penalty for the peculiarity of our configuration.

"In a paper in the *Medico-Chirurgical Transactions*, vol. xlv., I pointed out that the amount of growth in the shafts of certain of the long bones differs a good deal at the two ends. Thus in the case of the thigh-bone the elongation of the shaft is effected, chiefly, at the lower epiphyseal line, whereas in the humerus it is chiefly at the upper end. I further showed that the relations of the muscular and other soft structures to the bone, during this inequality of growth at its two ends, are maintained by an interstitial growth in those structures, combined with a continual shifting of them upon the surface of the bone toward the part at which the growth is proceeding most quickly.

"In the jaw it is evident that a change of the same kind must go on. If the elongation of the jaw takes place, exclusively or chiefly, by addition to the hinder edge, the newly added portion would, unless there be some compensating adaptation of the soft parts, be left uncovered by muscular fibres; and the masseter and internal pterygoid muscles, instead of retaining their position on either side of the 'angle,' would, in course of time, be found at the middle of the body of the jaw, or even nearer to the chin. The compensating adaptation is effected through the provision that, although the bone grows only, or chiefly, at the back part, the periosteum and the adjacent soft parts grow interstitially in their whole length; and as they grow they slide, or are shifted, backward, along the surface of the bone, so as to retain their proper relations to it. During this shifting of the periosteum, a slight traction is exerted upon the vessels and nerves passing to and from the bone, which causes an alteration in the position and direction of the foramina, transmitting them into the bone. This affects, to a slight extent, even the mental foramen, which at birth slants, from within, forward, and which, during the first dentition, is placed beneath the anterior molar, whereas after birth it slants rather backward, having a rounded hinder edge, and an overhanging anterior margin; and in the second dentition it is found in a line between the two bicuspids, or beneath the hinder one.

"In the upper jaw the changes are very similar to those in the lower. The permanent molars, developed behind and above one another in the 'tubercle,' descend and move backward; and the space for them is formed by addition to the hinder part of the tubercle. During this period the contiguous pterygoid processes of the sphenoid bone undergo alterations similar to those in the coronoid processes of the lower jaw, that is, they receive addition behind, and are absorbed in front, and are so rendered more vertical. The malar eminence of the maxillary bone, and with it the zygoma, are, in like manner, thrown backward; and, as the bone is deepened by addition to the alveoli from beneath, and as the teeth grow down into the alveoli, and become distanced from the orbit, the interval between them and the orbit is occupied by the antrum."

BRITISH JOURNAL OF DENTAL SCIENCE—NOVEMBER.

"ODONTOLOGICAL SOCIETY OF GREAT BRITAIN, Monday evening, November 7, 1864. EDWIN SAUNDERS, Esq., President, F.R.C.S., in the chair."

After the nomination of several candidates for membership, and the announcement of the presentation of a number of books to the library, the president remarked: "When I last had the pleasure of meeting you in this room, we were at the height of the London season, which had set in with, perhaps, something more than its usual severity, and your powers of working and endurance were tested pretty fully. We thank you for your attendance on that occasion, because we know it was at some personal sacrifice. Since then I trust you have all repaired to the sea-coast, or to the mountains and lakes of this or more favorite climes, and accordingly recruited your strength. During that short space of time, some events have happened which cast a shadow over our spirits. First, we have to deplore the loss, by death, of our first President, Mr. Samuel Cartwright, a man in many respects very remarkable—a man who seemed, by his physical organization and by his intellectual activity, to be marked out for a prominent position, and that he gained in his profession. He was one of that noble band of which England can show so long a list, and of which she is so justly proud—the band of self-made men. By virtue of an indomitable will and untiring energy and consummate skill, he contrived to cleave his way to the very foremost position in his profession. In society he was genial, warm-hearted, hospitable, liberal. We sympathize with his family; we feel his loss ourselves; we feel that it is a loss not only to those more immediately connected with him, but a loss to the public at large, and a loss to this Society. We have also to record another death in our ranks, that of Mr. Samuel M'Clean, the worthy son of a worthy father, who occupied in the metropolis of Ireland somewhere about the same position that Mr. Cartwright occupied in this metropolis, and also, for a very extended period, practiced his profession with great honor to himself and with great advantage to the public. He was not of us; but he was with us in spirit. He was dear to many of us who had the privilege of his acquaintance; and we all feel under obligation to him for attendance at this Society in former times, and for having given us a very valuable paper on the systematic extraction of the first molar teeth. We have another subject which saddens us in the illness of such a character as to preclude all hope of our ever seeing him again among us, of Mr. John Parkinson, the second President of this Society. He is well known to us, and I am sure his many virtues have endeared him to us all. He was a thorough English gentleman; he was high-minded and honorable; he had always a good word to say of every man, young or old, in the profession wherever he could conscientiously give it; he was singularly unaffected and simple in his demeanor; and I am quite sure we all feel heartfelt deep sympathy with him in his present affliction.

"MR. OWEN.—Mr. President and gentlemen: A little while ago I received, in common, I have no doubt, with some others here, a circular relating to a newly constructed GAS-furnace for metals that require a high temperature for their fusion, and, from the description, I was induced to communicate with the inventor, and to suggest, in the interests of this Society, that he should send us one for exhibition this evening. I have accordingly received one from him; and with your permission, by-and-by, I shall be able to show the members present its capabilities. As it

will, I have no doubt, be an object of considerable interest, and members may not be able to examine it satisfactorily while in a heated condition, I may, perhaps, be allowed to describe the arrangement of it with the aid of the drawing which has been hung up for the purpose. This drawing represents the furnace in section. This part, A A, (pointing,) is a fire-case cylinder, incased in iron, open at the bottom, and covered by a loose covering, B B, with two plugs, to be taken out as occasion may require to give access to the crucible Q. Inside this first cylinder is a second cylinder of the same material, O P, a space being between the two, and the latter stands over an opening in the bottom of the iron case. The flame, which is produced in the manner I shall presently describe, passes round the crucible from the burner, which is at the bottom of the inner cylinder, fills this part of the furnace, embraces the crucible entirely, passes over in every direction downward between the two fire-clay cylinders, and out through a chimney, E, at the *bottom* of the outer one. Now this is, as I said, a GAS-furnace, and the burner, K, which supplies it, is exceedingly ingenious, and apparently a very effective apparatus. It is made of corrugated copper, somewhat in the form of a lady's fan, but united at the extremities, so as to form a cylinder somewhat of that character, (showing.) An open brass tube, L, is united to the bottom of the burner; the gas is admitted by this tap, M, just as in an ordinary wire-gauze burner, and mixes with the atmospheric air, which has access at the bottom, naturally rises to the surface of the burner, and is distributed there in thin layers, which are divergent from the centre; and a further supply of atmospheric air is drawn by the chimney along the outside corrugations of the burner, and so coming in contact at each side with a thin film of intensely hot flame at the point of combustion, adds immensely to its heating power. That is the principal novel feature of this invention, save this, that by means of a chimney of a moderate height, such as you see there, you get all the effect of a *blast furnace*, without a bellows or anything of that kind; and the capabilities of it in the way of melting metal seems to be very satisfactory. That furnace which you now see is, according to the statement of the maker, capable of melting six ounces of cast-iron; and a furnace of double the size, which double-sized furnace would consume about sixty feet of gas in the course of an hour, amounting to something less than 4*d.*, is capable of melting fifty ounces of copper or forty ounces of cast-iron. Now, the melting point of cast-iron being considerably higher than that of gold—2786 is the melting point of cast-iron; that of gold, 2016—it follows that for the purposes of the dentist, it would have a very considerable power; but I apprehend that its usefulness might be extended beyond the mere melting of metals. I do not see why it could not be applied to the baking of mineral teeth, for the heat certainly is very intense. There is a kind of throttle valve, S, by which the atmospheric air mixing with the gas inside the burner is regulated, and a register on the tap by which the quantity of gas may be adjusted. When it is considered that heretofore we have been unable to get anything like a portable GAS-furnace, capable of producing so intense a heat as is required for the melting of gold, I could not but think, sir, I should be doing good service and offering a good example to many members of this Society in bringing this before their notice.

“Mr. TOMES.—A furnace similar to this in some respects was, three or four years since, proposed, and its service advocated in pretty much

the same terms as those in which Mr. Owen has brought this apparatus before us. It, too, would melt cast-iron and melt copper; but it would not bake mineral teeth. Such a furnace—a small one, I think—is within the building now, having been purchased by Mr. Makins for the purpose of giving illustrations in his class. There we patiently tried to make mineral teeth, but quite without success; yet the furnace would melt copper, and would melt cast-iron. But if this is more effective than that furnace, the name of the inventor of which I forget, it would be, no doubt, a great boon, and would enable many persons to construct teeth for their own use, who now are debarred from doing so in consequence of the great bulk of a furnace and the length of time consumed in getting up the necessary heat. If, however, this new furnace should turn out to be effective, it would be a matter of great convenience and of great use.

“Mr. OWEN.—In the specification, the patentee of this furnace has mentioned a different arrangement of burner suitable for different purposes. I should not expect this form to answer the purpose of baking teeth exactly; but, inasmuch as the same principle might be carried out by giving the flames of mixed gas and air a parallel arrangement alternating with the external layers of pure air, a very much larger amount of heat might be produced.

“Mr. COLEMAN read the second and concluding report of the Committee appointed to investigate the compounds employed for filling teeth most generally known as osteo-plastic. * * * Though reporting unfavorably of them as fillings, the Committee recommended them as being very valuable in the following cases: First, as a temporary filling for a few weeks, where it was desired to diminish the sensitiveness of the dentine; secondly, in cases where it was desired to cap temporarily a pulp exposed in excavating a cavity or cutting out decay from front teeth; thirdly, as fillings for teeth, the walls of which were too slight to bear any other kind of stopping, especially when they supported mechanical appliances in the mouth. They had also been found very serviceable in cases where the fang of a tooth had its sides too slight and its cavity too large to admit of the process of pivoting in the ordinary way. In concluding their report, the Committee could not but feel that those who anticipated that those fillings would supersede every other, must have experienced much disappointment when they found to how limited a class of cases they were applicable, and trusted that the discouraging results which had attended their investigations would not deter any gentleman who might be seeking to discover a more perfect kind of white plastic cement than had yet been offered to the profession from prosecuting experiments to that desirable end. They felt that white, or nearly white cement, as durable as gold and as plastic and adhesive as oxychloride of zinc, would be almost invaluable in preserving the front teeth, thereby often avoiding a great display of gold in the front of the mouth, which was anything but ornamental to the wearer.

SAMUEL CARTWRIGHT,
JOHN TOMES,
W. A. HARRISON,
ALFRED COLEMAN.

“Mr. CHARLES JAMES FOX then read a paper *On the Preparation of the Mouth for the Reception of Artificial Teeth*.

“I consider myself as much an advocate for Conservative Dental Surgery as any of my fellow-practitioners as far as *teeth* are concerned, but

fear that, to a certain extent, as regards *roots*, we shall be at variance. We all know that in surgery a portion of a limb is better than none at all; but surely even the eminent originator of the term Conservative Surgery (Mr. Fergusson) would not tolerate the continuance of even so much diseased bone at the end of a stump as would cause such amount of tenderness and puffiness of the limb as would interfere with the patient's comfortable enjoyment of a wooden leg. My simile, perhaps, is not quite apropos of Mr. Fergusson, who, judging by his recent lectures at the College of Surgeons, seems to be a confirmed enemy of wooden legs; but even in his own grand operation of excision of joints, when, instead of a wooden leg, he readjusts the patient's own limb, as it were, to his stump, he would scarcely rest satisfied if the patient, after a lapse of some time, was debarred from the free use of his limb, owing to the presence of a small portion of diseased bone. Would he not at once excise the offending piece?

"My theory is that the root of a tooth is neither more nor less than a piece of diseased bone, and nature appears to hold the same opinion, for does she not use every effort in her power to eject it? There are certainly some exceptions; but they are comparatively so rare that the treatment to be adopted in such cases should not be the *rule*, but the exception. Before going further, I would divide roots into four classes:—

"First, the roots of such teeth the crowns of which have been lost by neglected decay; that is, have never been stopped or treated in any way whatsoever.

"Secondly, the roots of those teeth which have been inefficiently stopped, or in which the patient has neglected to have them restopped from time to time.

"In the third class, I would place the roots of such teeth as have been kept stopped from time to time, but in which the advancing decay has necessitated a more advanced cutting away at each operation, until at last so little has been left of the original structure that the crown is fairly broken off.

"There is a fourth class, in which may be placed those roots which are the remains of teeth that have been gradually ground down by their antagonists till they are level with the gum.

"Now, with regard to the first class, it is rare to find a case in which the roots of such teeth are even moderately healthy, inasmuch as the tendency of decay has been to creep upward into the fang long before the crown has broken off, and few will differ from me in the opinion that all such roots should be unhesitatingly removed; for, if plates are placed over them the result will be constant pain and annoyance to the patient. With regard to this class of roots, it is unnecessary to detain you with any arguments in favor of extracting them prior to supplying the patient with artificial teeth, for whatever advantages those who advocate retaining them conceive to be gained by their retention, they are all, in my opinion, outweighed by the undeniable fact that you have a mass of corruption retained in the mouth, vitiating the saliva, poisoning the breath, and injuring the system generally. The second class are those which would be amenable to treatments as mentioned by Mr. Rogers, and a short time would suffice to show whether they should be condemned with the first or retained with the next class.

"With regard to the third class, the roots are so far free from active disease, that it would not be right to blame the dentist for placing a plate

over them; and it is to this and the fourth class that reference will be made when weighing the *pros* and *cons* of removing them or not. It has been suggested to drill the pulp canal and stop such roots with gold; but, if a patient is willing to put up with this extra trouble and expense, and the roots are sufficiently healthy to bear it, why not pivot such roots and thereby secure a firmer support for artificial teeth at the back? Such cases have come under my notice with the six or eight upper front teeth so treated, and a plate worn for the back teeth. Those who advocate the retention of such stumps in the mouth would, no doubt, point triumphantly to the long-continued existence of the stump which holds such pivot; but the stump of a pivoted tooth stands a far better chance of continuing healthy than it would do were it covered by a plate. If covered with a plate, it is subjected not only to a direct pressure, but, as it gradually becomes even slightly elongated by the process of ejection, it has to undergo a continual from side to side pressure, according as the patient bites on the one side or the other of it, inasmuch as the plate must acquire a slight rock upon the gradually extruding root.

"Again, if from a slight constitutional disturbance the gum around becomes a little tumid, it will very soon be pinched between the edge of the root and the plate, producing an amount of annoyance which must be felt to be appreciated. Undoubtedly many cases may be instanced where teeth have been worn under these circumstances for years; but, as a dentist once remarked to me, such cases go to prove only how much nature may occasionally be made to endure or tolerate, but are no proof that it is right she should do so.

"The great argument adduced by those who favor the retention of roots in the mouth, is that it preserves the contour of the face. The importance of this consideration is unquestionable, and before the days of vulcanite would have seemed unanswerable. But we are now enabled so fully to restore the lost alveolus without adding very considerably to the weight of the piece, that if other reasons induce us to advise the extraction of the roots this one need not deter us. It will be said that to this artificial bulk the muscles are not attached; but this very consideration would lead me to think favorably of the early extraction of roots. We all know that later in life the power of patients over the muscles of the jaws is not so great as when they are young; and I am not now alluding to those muscles that are attached to the maxillæ in close vicinity to the alveolus, but to those which are more remote from it. A young mouth, in which, from premature loss of the teeth, the alveolus is almost entirely absorbed, will far more readily accommodate itself to a large bulk of foreign matter than an old mouth will, and therefore it appears to me best practice to secure, internally, an aged condition as early as possible, for if the prematurely aged gums are so surmounted with a stout artificial alveolus, the muscles of the lips, with their youthful strength and energy, will readily accommodate themselves to the foreign mass, and retain the semblance of youth much longer than they would if the stumps were not removed till later in life.

"A young lady, of prepossessing appearance, has been for some years under my care, who, at the age of eighteen, met with a severe accident, which resulted in the loss of several front teeth and the exfoliation of a considerable amount of the alveolar process; the lost substance was replaced with a vulcanite piece, and from time to time such large portions of the alveolus have had to be removed, as well as nearly all her remain-

ing upper teeth, that her mouth presents all the appearance of an aged edentulous jaw; nevertheless, when she has her piece in, the most observant would not detect that she had sustained any loss, though the external appearance, when the teeth are removed, is very far from youthful. Now, I am quite sure that this lady will retain the youthful appearance of her mouth much longer than a person would who had not become accustomed to the bulk of foreign matter in early life. Some time ago a young girl came under my care, who had lost, by neglected decay, the four upper incisors. In this case, on my advising the removal of the roots, one of our most eminent practitioners was consulted, with my consent, as to the propriety of my opinion. He advised pivoting, and his advice would have been followed but for the extremely crowded and awkward disposition of the roots. He advanced this very argument against the extraction of the roots, that the alveolus would become so much absorbed so early in life. It was this gentleman's remarks upon the case in point that led me very carefully to weigh the matter in my mind, and, as yet, I am not a convert to his opinion.

"The fourth class of roots mentioned was that in which the crown had been gradually worn off by the contact of the opposing teeth. You will see two or three models of such cases on the table, and no doubt the work-room shelves of most of you could furnish many similar examples. One fact in connection with them is that two out of the three were corn factors, in the constant habit of chewing corn. One gentleman, whose model I have here, and whom we will call Mr. P——, especially described to me that when tasting different grains of corn to test them, even before the loss of his molars, he used his front teeth to chew the corn with, and then tasted it between the tip of his tongue and that part of the palate immediately behind the central incisors just over the anterior palatine canal. These remarks may seem somewhat discursive, but you will understand them on being told that the fact of the proper exercise of his trade being, according to his account, dependent upon the accuracy with which he could triturate and immediately taste the grain, hampered me very much in my treatment of the case. Under ordinary circumstances, the front teeth should have been pivoted, and a plate supplied for the rest. As it happens, my treatment did not satisfy him, and I am happy to say he passed into the hands of my good friend, Mr. Vasey, who, I hope, may be more successful. The great difficulty in his case was, that he did not care about having the teeth at all; but his wife particularly wished him to have them on the score of appearance, and yet he naturally would not consent to sacrifice the comfort he derived from those two active little masticators.

"To return more immediately to the general question: As to the removal of stumps, the first principal objection is that you thereby destroy the contour of the face. This is a question of appearance, and has been replied to above. The second is, that you thereby destroy the alveolar ridge, and this is a question more of utility; but even here the same argument may be used as in reference to preserving the contour of the mouth, for where an edentulous jaw is inevitably the fate of patients at a comparative early age, the earlier they become thoroughly accustomed to it the more likely they are to have permanent comfort in their old age. This is not advanced as a positive assertion, but put forward for your consideration. It is just one of those questions that can be best spoken on by those elders of our profession who, from length of years, have been

enabled to watch the progress of some of the patients of their younger days to more advanced life. Supposing the decision of experience should be against me, I should only be content to resign the lower jaw to the reign of roots; for, as regards the upper, the power of obtaining a hold upon it through the instrumentality of the palate, even when the alveolus is entirely absorbed, is so great, and the presence of roots is so great an obstacle to the perfection of such hold that if retained it would be against my advice; but in the lower jaw I am more willing to the retention of roots, especially in the front of the mouth, and where the patient has sought for artificial teeth for the first time at an advanced period of life. You see here such a case, in which about a fortnight ago I declined to remove the roots, although urged to do so, for with this lady's inexperience in the use of artificial teeth such a little mound in the front of the mouth was invaluable. My previously expressed opinion as to the ill effects of the presence of decaying matter has not escaped my recollection; but such cases as this are of an exceptional nature in which we have to choose between two evils.

"My observations upon the propriety of removing roots, prior to the adaptation of artificial teeth, have reached to such a length that this portion of my subject must be hurried over, or I fear your patience will be exhausted before my paper has been made to bear out its title. There is much yet to be said on the subject, as, for instance, on the frequent discomfort of patients from the misfit of gold plates within a few months, from the extrusion of roots, although nothing could have been more perfect when they left the dentist's hands. The constant liability of vulcanite plates to break over such roots, for the practice of putting vulcanite plates over roots is a fruitful source of the discredit into which vulcanite too often falls from frequent fracture; the constant occurrence of neuralgic pains about the head and neck, referable by the patient to no definite point, and for which the medical man is far oftener consulted than the dentist; the nausea that we hear patients sometimes complain of; the bad taste, which they attribute to the peculiarity of the material, where vulcanite is used; and the inferiority of the gold where gold is used. In common with many other gentlemen who think with me, I could instance many cases where my superior skill has been praised for teeth in no ways superior to those supplied by hundreds of others, simply because the removal of roots have been urged before supplying new sets. All these and many other points there is not now time to dilate upon."

"DEATH FROM CHLOROFORM IN KING'S COLLEGE HOSPITAL.—On Friday, June 24th, an inquest was held at King's College Hospital on the body of Mrs. E. Ruth, aged twenty-nine years, who died under the following circumstances: Chloroform had been administered to her in the hospital with a view to the removal of a tumor in the urethra, but she died from the effects of the vapor. A question arose as to the quantity administered to her on a similar occasion two years before, and the absence of books of reference in such cases in the hospital. The jury returned the following verdict: 'That the deceased died from the effects of chloroform;' and the jury expressed their opinion that proper case-books for reference should be kept in the hospital."—*Medical Times*.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"Organic Substances artificially formed from Albumen. By ALFRED H. SMEE, F.C.S.—In a former paper which I had the honor to submit to the Royal Society, I showed that fibrin was formed by the passage of oxygen through albumen, provided a temperature of 98° F. was maintained. It was then observed that a slightly acid state of the albumen, or the absence of the alkaline salts, was found to be most favorable to its formation. I noticed, also, that ammonia had little effect in preventing the formation of fibrin, but after the lapse of a short time caused it to swell to such a degree that its microscopic characters could no longer be determined. It was observed that albumen acted on by gastric juice and passed through a membrane, still had the capacity to form fibrin in small amount.

"Since the publication of that paper, I have conducted the following experiments in addition to those before mentioned. I submitted some of the fluid drawn off from a spina bifida to the action of oxygen and heat in the ordinary manner; after the lapse of a few hours it yielded a substance which, under the microscope, presented all the characters of fibrin.

"I tried to obtain fibrin from the urine in two cases in which it was highly albuminous. The urine was so loaded with albumen that it became almost solid by heat. I never have been able to transform this variety of albumen into fibrin, although the experiment was tried in many ways. I expect that on further investigation it will be found that the albumen found in urine (in most cases at least) is a substance not capable of further development.

"The next experiment which I have to describe is to my mind one of the most beautiful exemplifications of the artificial formation of organic bodies under physical laws, producing results similar to those which we observe under certain circumstances in disease, the changes being produced by the action of a gas on a second body separated by a membrane, and having to traverse it before the chemical changes can be effected.

"I passed a current of oxygen gas through a small portion of perfectly clean intestine, with the peritoneal coat attached. The intestine was placed in an albuminous fluid at a temperature of 98° F.; at the end of twenty-four hours I found the intestine completely invested with minute fibrinous outgrowths, similar to those seen on the intestines of persons who have died at the earliest stage of peritonitis.

"It is worth noticing that although these fibrinous outgrowths take place when the peritoneum of the intestine remains, yet if this coat be stripped off they take place to a very limited extent. In many cases no outgrowths appear, even where the conditions of the experiments are equal.

"It appears to me that the tendency of fibrin to be deposited on serous membranes, under favorable circumstances, may throw some light on the frequency with which we find the surfaces of serous membranes (for instance, the pericardium) so often coated with fibrinous outgrowths.

"If hydrogen is passed through albumen to which a small quantity of potash has been added sufficient to insure a slight excess of alkali, after the lapse of some time a dense, hard, horny mass will be observed, especially at the point where the hydrogen comes into contact with the albumen; in fact the growth of the substance often clogs the tube to such a degree that the hydrogen is prevented from further passing through it. It also has a tendency to grow upon platinized platinum when placed in the albuminous fluid while the current of hydrogen is passing. The time required is, as a rule, about four days; a temperature of 98° F. rather favors its formation, but is not absolutely necessary to its production.

"The following are the chief chemical and physical reactions of the substances formed by hydrogen.

"It is heavier than albumen, always sinking to the bottom of the vessels. It is hard, tough, semitransparent, homogeneous, and slightly elastic. It swells up in cold water, and dissolves to a limited extent. The extent of its solubility is less the longer the time occupied for its formation. It is more soluble in hot water. Peroxide of hydrogen is not decomposed by it.

"The watery solution is not coagulated by boiling; it is, however, precipitated by chlorine. Hydrochloric acid does not form a blue solution with excess of that reagent. Bichloride of mercury and bichloride of platinum, after the lapse of some time, precipitate it. Tannic acid, alcohol, acetate of lead, sulphate of the peroxide of iron, and alum, also precipitate it from its solution. It is turned yellow by nitric acid and heat. It likewise contains a small quantity of sulphur. Chondrin behaves in a similar manner, in its chemical and physical relations, to the substance thus artificially produced, and hence I propose to call it 'artificial chondrin.'

"In carrying out these experiments, I found that a very nice method of obtaining a constant and equal amount of hydrogen gas was by collecting hydrogen formed at the negative pole of a one-cell battery, and passing the hydrogen thus formed directly into the albumen. The amount of hydrogen required was regulated by increasing or diminishing the size of the negative pole.

"This form of apparatus will constantly remain a week or more in action without any appreciable alteration in the quantity of hydrogen evolved.

"It may be well to describe the construction of the apparatus used. I first take a common precipitating glass, and place in it a few pieces of zinc, with a little mercury to amalgamate it. I then take a tube about one-fourth of an inch in diameter, and bent in two places at a right angle; into one end I insert a platinum wire, and this end I place in the glass containing the zinc; the other end I place in the vessel containing the albuminous fluid. Dilute sulphuric acid is then added to the zinc. When contact takes place between the platinum wire and the zinc, a constant stream of hydrogen is given off from the platinum wire. The amount of hydrogen required can be regulated by making a larger or smaller surface of the platinum come in contact with the zinc. The amount of oxygen which is carried over is very limited, provided a tube is used of one-fourth of an inch in diameter; but when a tube of one and one-fourth inch is used, a quantity might pass sufficient to interfere with the experiment.

"The amount of oxygen at times thus carried over when the large tube is used is so great that a change in the products may take place, and fibrin may be formed in the place of the chondrin, provided the albumen is not over alkaline.

"As fibrin was formed by oxygen, and this new substance analogous to chondrin by hydrogen, it occurred to me that these two substances might be formed simultaneously by a simple-cell voltaic arrangement. For this purpose I took a tube with one end closed by parchment paper, or sometimes by animal membrane, filled it with albumen which had been made slightly acid by acetic acid, and inserted it into a small vessel containing albumen, to which a small quantity of potash or soda had been added. I then connected the two fluids by means of a platinum wire, so that one side might become a positive and the other a negative pole. Considerable action took place after the lapse of some time, when, upon examination, I found the albumen in the tube was changed, not into the fibrillated fibrin, but into a granular material. The other pole, or rather the alkaline albumen, was changed into a substance which behaved with various reagents in different ways. In some cases it was a tough, ropy, and viscid substance, which was coagulated in water by a solution of acetate of lead, was insoluble in acids and in alcohol, and very slightly soluble in alkali. At other times I have noticed a substance formed having very much the appearance of the expectoration of bronchitis; and at other times the dense hard substance analogous to chondrin in its behavior with reagents was formed.

"The various states of the material into which albumen is converted appear to be influenced by the nature of the alkali employed and by the relative size of the negative pole. The temperature should be as nearly as possible constant during the time the experiment is being conducted. The amount of the surface of membrane interposed appears to have very little influence over the products. When soda was the alkali employed, the viscid and frothy mucus-like product was more frequently obtained.

"The amount of water present appears to have a very decided influence on the product formed. When the viscid and frothy material is produced, it appears to form quicker than the hard and dense chondrin. The temperature of 98° F. appears to favor the production of the chondrinous material; but I must admit I have sometimes made all the varieties, the viscid, the frothy, and also the chondrin, at much lower temperatures.

"In one case I succeeded after many experiments in obtaining from the acid pole, by keeping it at a temperature of 98° F., fibrin of the fibrillated form, but the greater portion of the albumen at this pole was converted into the granular form. The alkaline pole formed pretty constantly the dense, hard, artificial chondrin.

"When hydrogen was passed through serum, after the lapse of a day or two a tough elastic product was obtained.

"In experiments tried by passing hydrogen through albumen greatly diluted with water, I found, after the lapse of a few days, a flocculent deposit very similar in appearance to the deposit of mucus which often takes place when urine is allowed to stand a short time. This point, however, requires further investigation. I tried also the effect of passing hydrogen through a portion of intestine inserted into an albuminous fluid. I have not as yet been able to form either the dense, hard, or viscid frothy substance by this method. I repeated the experiment for the formation

of fibrin from albumen, by decomposing the water of its composition by electricity. I must admit this is the most difficult, troublesome, and unsatisfactory of all the methods I have employed. I find that the great tendency of the poles to form different substances on them, and the great rapidity with which they grow together, lead, without the greatest care, to the belief that two different substances, differing only in density, are formed at one and the same pole, so intimately blended are they together. Thus I was led to believe at first sight that a dense hard substance was formed at the oxygen end, and not until I had repeated the experiment many times did I discover that the substance belonged to the hydrogen and not to the oxygen pole, and had grown across from one pole to the other.

"I have obtained on several occasions fibrin and chondrin at the same time, by conducting hydrogen and oxygen derived by the decomposition of water by voltaic electricity through separate tubes. The oxygen passed into slightly acid albumen formed fibrin; the hydrogen passed into alkaline albumen formed either the chondrin or else the frothy and viscid material. The temperature was kept up at 98° F. in these experiments. On one occasion, however, I happened accidentally to reverse the current, (that is to say, the hydrogen was passed into the acid, and the oxygen into the alkaline albumen,) when no chondrin or fibrin was formed.

"The following conclusions I have arrived at after the study of the influence which oxygen and hydrogen gases exert upon albumen when submitted to their action separately at a temperature of 98° F., the normal temperature of the living body. Albumen under the action of oxygen forms, after the lapse of a longer or shorter period, fibrin. The fibrin thus artificially produced is of three distinct varieties, viz., 1st, the granular form; 2d, a form allied to lymph incapable of being unraveled into fibrils; lastly, the true fibrillated fibrin. The law which appears to regulate the state into which the albumen is converted, as far as my observation has gone, is one of molecular aggregation, similar to the electric deposit of metals, as the slower the fibrin is formed the more organized is it in substance.

"I have observed that when fibrin is rapidly formed it is almost always produced in the granular state; this is particularly the case with fibrin formed from albumen by the decomposition of the water of its composition by voltaic means.

"Lymph I consider to be imperfectly formed fibrin, more highly developed than the preceding or granular form. It is possible for this artificially formed lymph, under favorable circumstances, to assume a more organized appearance.

"I have no doubt that the fibrinous outgrowths on the intestine would have become larger and more developed if the experiment had been carried on for a sufficient length of time. In fact almost all the fibrin formed round a platinum wire inserted into albumen is at first covered by outgrowths of a soft structure. These outgrowths, at the earliest period of their formation, do not, under the microscope, present any appearance of fibrils. After the lapse of some time they appear to undergo condensation, and then to organize to such an extent that it would be difficult at first sight to determine whether the substance might not be a portion of fibrous tissue.

"The alkalies, with the exception of ammonia, prevent entirely the

formation of fibrin. Ammonia, although it does not retard its formation, dissolves it after the lapse of a short time. The acids and absence of alkaline salts favor its formation. The opposite, however, is the case with the hydrogen products, as an alkaline state favors their production.

"The action of hydrogen on albumen, as far as my investigations have as yet proceeded, forms substances analogous to chondrin and mucin. I believe that the organic substances, chondrin and mucin, products formed in a living organism, are very nearly allied to one another, if not varieties of the same substance, differing only in their mode of aggregation and stages of development, and the amount of water in their composition.

"Of the exact mode in which hydrogen acts on albumen we are at present ignorant. I have noticed that in some experiments sometimes one, sometimes the other product was obtained, even when the same influences were apparently acting on experiments conducted at the same time.

"Considering the important physiological part that fibrin, chondrin, and mucin play in the living body, the production artificially of substances analogous in their behavior with reagents to those products formed in a living organism will, I trust, be taken as a sufficient excuse for submitting to the Royal Society a paper so obviously deficient in many parts, but which, nevertheless, it would require a vast amount of both time and labor to carry one step further."—(*Proceedings of the Royal Society.*—*Boston Med. and Surg. Journ.*)

"*Degeneration and Regeneration of Nerves.*—M. VULPIAN has lately discoursed on this very interesting subject in his lectures at the Museum of Natural History in Paris. The physiological property of motor and sensitive nervous fibres is the property of undergoing certain modifications under the influence of some agent. This property belongs to the nerve-fibre, independent of the nervous centres. I am thoroughly convinced, says M. Vulpian, that the origin of this property of the nerve is to be sought for in the nerve-fibre itself. Our classical works tell us that the nerves borrow their force or property from the nervous centres; but this is a complete error. If a motor nerve received its properties from the spinal marrow, it ought to lose them when cut; but it does nothing of the kind; for, when the peripheric end of the cut nerve is excited, the muscles contract; and, more than this, when its nerve-force has been exhausted by long and continued excitation, it recovers its force under repose. It is strange that this simple demonstration has not convinced every one.

"In considering the phenomena attending the disappearance of the nerve-force, we have to observe—1. The duration of the excitability of the nerve after section. 2. The mechanism of its disappearance.

"In 1838, Müller investigated the first of these questions—the duration of the excitability of the nerve; and he concluded that it disappeared after some weeks. In 1840, Gunther and Schön made similar observations; and in 1841, M. Longet obtained similar results. It was also noted, that when, after section, the nerve had lost its properties, the muscle to which it was distributed still preserved its power of contractility—showing the independence of muscular irritability. Brown-Séquard and Martin Magron have seen muscular irritability last longer than two years in certain animals, although every trace of excitability had disappeared in the nerve which had been cut and passed into the muscles.

Another proof of the fact that muscular contractility is independent of nervous excitability, has been given by M. Bernard. He has demonstrated that when the action of the motor nerves over the muscles is absolutely arrested, muscular irritability, contractility, may still exist.

"The question as to how the nerve loses its properties is of the highest interest, and its answer will give us a key to some of the most interesting phenomena which have exercised the sagacity of physiologists.

"The force or property of the nerve disappears as a consequence of alteration of the nerve-substance; but this alteration is not appreciable by our means of investigation, until the nerve-force has completely disappeared. The changes of degeneration which go on in the cut nerve are influenced by different circumstances. Thus the changes go on more rapidly in a young than in an old animal. In the young, the complete change is effected in about two months; but in an old animal, not before six or seven months. The species of animal and season of the year also modify the result.

"According to M. Waller, the change of structure of the nerve is due to interference with the nutrition of the nerve-fibres. The spinal marrow, in his view, is the centre of nutrition of the nerves—of the motor nerves, at least; so that, when the nerve is cut, its nutrition is disturbed, and change in structure results. M. Waller cut both the roots of a spinal nerve; and he found that change of structure did not occur in both of the so cut nerves. In the anterior root, he found the peripheric end alone degenerated; and in the posterior root, the central end. Hence he drew the conclusion, that the sensitive fibres have for their nutritive centre the ganglions of the posterior roots. This deduction is strengthened by the fact that, when the posterior root was ligatured beyond the ganglion, the outer end—the peripheric—was altered in structure.

"On the same basis of facts, M. Schiff has made many interesting researches concerning recurrent sensibility. He cut the anterior root, and found, as Waller had done, that the peripheric nerve-fibres were changed, and that the central ones remained healthy. But he also found that some of the fibres in the peripheric cut end of the nerve remained sound; and that some in the central end were altered. And of these fibres, those which remained unchanged in the peripheric end, and those which were altered in the central end, were evidently fibres emanating from the posterior root. Hence the conclusion that recurrent sensibility is due to recurrent nervous fibres. How the gray substance can have a nutritive influence over the anterior root, and the ganglion over the posterior root, remains to be shown; but the fact appears certain.

"In this way Waller has discovered an excellent means of studying the distribution of nerves by alteration of their fibres, and of recognizing in a mixed nerve the fibres which are sensory, and those which are motor. To this method of observation Waller has given the name of 'new anatomical method.'

"We may, indeed, expect great results from this 'method' of observation. Thus, for example, we know the union of the spinal accessory with the pneumogastric nerve. Well, if we divide the roots of the spinal accessory, wherever we find in the divisions of the pneumogastric altered nerve-fibres, we may safely say that they are fibres of the spinal accessory. If, again, we wish to know whether the nervous petrosus is a branch of the facial or of the fifth pair, (through the sphenopalatine ganglion,) we cut the facial nerve, and examine the petrous nerve in the course of ten

to fifteen days. We then find in it a mixture of healthy and changed nerve-fibres, and from this fact are justified in concluding that the petrosal nerve has a double origin. Again, does the chorda tympani go to the tongue? No; because, after cutting the facial, there is not found in the lingual a single fibre changed, beyond the fibres the submaxillary ganglion furnishes to the gland. These are examples of the value which this new method of observation renders to physiology and pathology.”—(*Brit. Med. Jour. and Am. Jour. Med. Sci.*)

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“Vaso-Motor Nerves.—The discovery of the vaso-motor nerves is of recent date. In 1852, M. Bernard showed that, after section of the cervical portion of the sympathetic, the temperature on the side injured was increased. Dr. Brown-Séquard subsequently proved that the increase of heat was the direct consequence of dilatation of the blood-vessels and of the increased flow of blood into them. Thus it was shown that certain nerves preside over the contraction of the arteries, and on this fact Dr. Brown-Séquard founded his theory of reflex paralysis. The Academy of Sciences has also lately rewarded M. Cohen for his researches into vaso-motor neuroses. M. Pontevéz, in a thesis, has lately given a complete *résumé* of the whole subject. The theory of the vaso-motor nerves is, as he says, a doctrine pregnant with important results, destined to revolutionize the practice of medicine. Thus, for example, the febrile state, heretofore supposed to be a state of excitation, is by this theory shown to be a state of weakness. The hot and red skin is produced by relaxation of the blood-vessels, just as it is produced after division of the sympathetic. Paralysis of the vaso-motor nerves produces congestion, their excitation removes it, and their destruction determines suppuration. In these facts we have a physiological and modern key to the character of inflammation.”—(*British Med. Journ. and Med. News*)

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Histology and Toxicology of Nervous System.—“M. ROUDANOWSKI has recently read, at the Académie des Sciences, a memoir of some importance on the structure of the nervous system, and a new mode which he has devised of investigating it. This last consists in slicing the nervous tissue previously frozen at a temperature of from ten to fifteen Reaumur. These slices are colored by means of an aqueous decoction of cochineal, and then covered with Canada balsam, or with a mixture composed of six or seven parts of *ichthyocoll* and eight of glycerin. Having described the minute structure of the spinal nerves and of the nervous centres, he gives an account of his observations upon the action of poisons on the nervous tissue. 1. Having poisoned cats, dogs, and rabbits by strychnine, nicotine, opium, and chloroform, he has found that all these substances induce changes in the nervous tissue. 2. The more energetic of these, as strychnine and nicotine, induce alterations in the nervous cells and their branches, while chloroform, opium, and perhaps alcohol, induce changes in the myeline. 3. The changes consequent upon nicotine are indicated by the strong pigmentation and destruction of nervous cells, with their prolongations only in the spinal cord at the point of commencement of the hypoglossal and vagi nerves. 4. Under the influence of these poisons he has remarked that, together with the congestion of the vessels of the roots of the nerves of the spinal cord, the reservoirs also increase in size. 5. A drop of an energetic poison, such as

nicotine, kills a large animal, not because it chemically alters the metamorphic processes of the entire economy, but because it destroys small organs like these nerve cells, which are the origin of the nerves of the principal vital organs. 6. Opium and chloroform act on the myeline, which, in place of assuming the form of amorphous granules, takes on that of brilliant shining bodies.”—(*Med. Times and Gaz.*)

Chloroform Illusions.—“Chloroform when administered by inhalation during the period of menstruation, Dr. Kidd affirms, may have the effect of inducing the belief that an assault has been attempted in a criminal way, while under its influence. Now, although we cannot, from our own experience, connect with certainty the fact of menstruation with this effect in more than a single instance, we are cognizant of three well-marked cases of the kind occurring in this city, and rumor speaks of several others. We were well acquainted with an elderly gentleman whose wife was so firmly convinced that a dentist had endeavored to take improper liberties with her while under the influence of chloroform, that he had much difficulty in convincing her that he, the husband, had not left her side during the whole time. We also knew of a young girl, who, after an important operation, during which this anæsthetic was administered, positively affirmed that an attempt had been made upon her chastity by the chief surgeon; and from which trouble might have arisen had not other surgeons been present, and her friends been in the adjoining room during its performance.

“The third, a case well known to the profession, in which a respectable woman, while menstruating, was put under the influence of chloroform for the abstraction of a tooth, when she afterward suffered so strongly from a similar illusion, that the husband being fully persuaded of its truthfulness, caused the prosecution and imprisonment of the dentist for assault. He was acquitted of the crime, but received a reprimand from the judge for having administered an anæsthetic without the presence of witnesses. This case elicited much comment at the time, and has had the effect ever since of rendering our physicians more than ordinarily cautious in the employment of chloroform in the absence of the patient's own friends.”—(*Ed. Canada Lancet.*)

Spasmodic Closure of Jaw from Dental Irritation.—“At the monthly meeting of the Odontological Society, held on Monday, the 5th inst., in Soho Square, Edwin Saunders, Esq., the President, mentioned a case which came under his notice of a young lady, twenty-five years of age, who was attacked with violent neuralgia, resulting in closure of the jaw for a period of from twenty minutes to half an hour. The attack recurred repeatedly. From the appearance of the mouth he suspected the lower wisdom tooth was concerned in the mischief, and on examination found the second lower molar was slightly decayed, and forced out of its place, setting up a good deal of irritation. He removed the second molar, and the patient had been free from the seizures since.”—(*Med. Times and Gaz.*)

Hypodermic Injections.—In treating of this subject, DR. HENRY GIBBONS states (*San Francisco Med. Press*) that “in the obstinate toothache of pregnancy, the injection of morphia in the submucous tissue of the gum gave instant and permanent relief in a case which had resisted other treatment.”

"Relation between Functions and Organs.—When one set of physiologists declare that organs give rise to functions, and another set declare that functions produce organs, the latter do not mean that the functions can exist without the organ, but that the organ may be enlarged, diminished, or modified by the manner in which the function is performed. M. C. Sedillot discusses this question in *Comptes Rendus*, (Nov. 13, 1864,) and it is evident that the flexibility of organs may play an important part in modifying species. Among the illustrations he gives in support of the modifying influence of function, he says: 'If a portion of one of the bones of the leg or forearm be removed, and not replaced by growth, the associated bone enlarges till it attains a bulk equal to that of the two bones whose functions it is to perform. This phenomenon is very evident in dogs in which the tibia has been removed; the companion bone, which is almost filiform, and not one-fifth the size of the other, soon acquires equal or greater dimensions.'"—(*Intellectual Observer*.)

"Sleep—Its Importance.—There is no fact more clearly established in physiology of man than this, that the brain expends its energies and itself during the hours of wakefulness, and that these are recuperated during sleep; if the recuperation does not equal the expenditure, the brain withers: this leads to insanity.

"Thus it is that, in early English history, persons who were condemned to death by being prevented from sleeping, always died raving maniacs; thus it is, also, that those who are starved to death first become insane; the brain is not nourished, and they cannot sleep. Crazy persons are poor sleepers, while good sleepers seldom become crazy. The practical inferences are these:

"1st. Those who think most, who do most brain work, require most sleep.

"2d. That time saved from necessary sleep is infallibly destructive to mind, body, and estate.

"3d. Give yourself, your children, your servants—give all that are under you—the fullest amount of sleep they will take, by compelling them to go to bed at some regular early hour, and to rise in the morning at a stated hour, and within a fortnight, nature, with almost the regularity of the rising sun, will unloose the bonds of sleep the moment enough repose has been secured for the wants of the system.

"This is the only safe and sufficient rule; and as to the question how much sleep any one requires, each must be a rule for himself; great nature will never fail to write it out to the observer under the regulations just given."—(*American Phrenological Journal*.)

Human Deterioration.—"There is a tendency perhaps in city life to diminish the size of the human form, (increasing, however, the fineness of fibre and improving the *quality*,) but there is no foundation for the very common belief that man has deteriorated from earlier ages. The *Scottish Guardian* says: 'It is a very common opinion that in the early ages of the world men in general possessed superior physical proportions, and were of a greater size than they are at present, and this notion of diminished stature and strength seems to have been just as prevalent in ancient times as at the present. Pliny observes of the human height, that "the whole race of mankind is daily becoming smaller,"—an alarming prospect

if it had been true. Homer more than once makes a very disparaging comparison between his own degenerated cotemporaries and the heroes of the Trojan war. But all the facts of the circumstances which can be brought forward on this subject tend to convince us that the human form has not degenerated, and that men of the present age are of the same stature as in the beginning of the world. In the first place, though we read both in sacred and profane history of giants, yet they were, at the time when they lived, esteemed as wonders, and far above the ordinary proportions of mankind. 'All the remains of the human body (as bones, and particularly the teeth) which have been found unchanged in the most ancient urns and burial places demonstrate this point clearly. The oldest coffin is in the great pyramid of Egypt, and Mr. Greaves observes that this sarcophagus hardly exceeds the size of our ordinary coffins, being scarcely six feet and a half long. From looking also at the height of mummies which have been brought to this country, we must conclude that those who inhabited Egypt two or three thousand years ago were not superior in size to the present inhabitants of that country. Lastly, all the facts which we can collect from ancient works of art, from armor, as helmets and breastplates, or from buildings designed for the abode and accommodation of men, concur in strengthening the proofs against any decay in nature. That man is not degenerated in stature in consequence of the effects of civilization is clear, because the inhabitants of savage countries, as the natives of America, Africa, Australia, or the South Sea Islands, do not exceed us in size.'"—(*Ibid*)

Adventitious Odontogeny.—In a letter from Dublin to the *Cincinnati Lancet & Obs.*, DR. PARVIN notes the following instance of this anomaly: "A most singular case occurred last Sabbath, at the Dublin Lying-in Hospital: A woman was delivered, at the full term, nothing unusual having marked her pregnancy, of a healthy, perfectly formed child; and after the birth, a hard, jagged body having been felt, at one stage in the labor, just within the os, Dr. Denham introduced his finger and removed this body, which, upon inspection, proved to be the greater part of a superior maxilla, containing a molar tooth, such a tooth, had one found under other circumstances, he would swear belonged to a person about fourteen years of age."

Growth of Lower Jaw.—In a notice of PROF. HUMPHREY's essay on this subject, the *Dublin Med. Press* says: "The physiological contribution demonstrates, among other facts, that the elongation of the lower jaw, during growth, is effected by gradual absorption of the fore part of the coronoid and condyloid processes, and additions to their posterior edges as well as to the angle. This he has shown experimentally, by attaching loops of wire through these processes in the pig of about three months' old."

Excision of Portion of the Lower Jaw. By GLASCOTT R. SYMES, one of the Surgeons of Steevens' Hospital.—"A great number of cases of excision of various portions of the lower jaw have from time to time occurred in Steevens' Hospital, especially in the time of the late Mr. Cusack. Many happy suggestions were made by that experienced surgeon, in reference to important points in the operation. It was his

habit, if possible, not to cut through the red border of the lips; thus, there was very little deformity afterward, and not only that, but the undivided lip served far better than any sutures in keeping the edges of the wound in apposition. I have heard that this was proposed to him by the late Mr. Maclean, the celebrated dentist; and, indeed, many important improvements, especially in the matter of instruments and surgical appliances, have emanated from the gentlemen of this profession. It is always well to have an assistant at hand to draw any teeth that may be in the way. Although a simple operation, yet nothing is so likely to discompose an operator as when he is baffled by a tight tooth; and generally, especially if the disease has lasted for a long time, the teeth are much longer and more tightly set in the alveolar process than what is usual. I find the best saw to use is Weiss' small straight tenon saw; it cuts through very rapidly, it can be used in any situation, and is much more manageable than the chain saw. One of the most important points of the operation consists in the situation of the horizontal incision; it should be made high up on lower jaw on a level with the teeth. In this way the facial artery does not retract much; but if the incision be made too low down, the artery retracts into the substance of the submaxillary gland, and the surgeon will experience the greatest difficulty in securing the vessel. I know of a case where this mistake was made, and the patient had lost an alarming quantity of blood, when the greater portion of the gland had to be included in a ligature before the hæmorrhage ceased. As to the occurrence of salivary fistula, we have found that it is only likely to occur where the parotid gland or its duct have been divided. Such an unfortunate *contre temps* does not usually take place when the submaxillary and its duct have been crossed by the line of incision."—*(Dublin Med. Press.)*

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"Removal of the Inferior Maxilla. By EDWARD BATWELL, M.D., Surgeon Fourteenth Michigan Vet. Vol. Infantry, in charge of Hospital Second Division, Fourteenth Army Corps.—The following cases of removal of the inferior maxilla, are remarkable for the rapidity of cure and also the facility with which nature accommodates herself to circumstances:—

"Case 1. Corporal A. B., Co. I., Fourteenth Michigan Vet. Vol. Infantry, was struck by a musket ball on the chin, shattering the right portion of the inferior maxilla, and driving several pieces of bone and teeth through the cheek and into the soft palate. An incision was made from the angle of the jaw along the lower edge of the ramus to the symphysis, joined by one from the middle of the lower lip, and the necessary dissection made to isolate the bone. The chain saw was applied at the angle and at the symphysis and the bone removed. The facial artery was the only vessel tied. No chloroform was used, and in *twelve hours the patient was around* administering to the necessities of his wounded comrades, and at the end of a month was at his home, the wound perfectly healed, and capable of using the ordinary fare.

"Case 2. Sergeant G., Tenth Michigan Vet. Vol. Infantry, on the 1st of September was shot through the inferior maxilla, fracturing the bone and lacerating the soft parts. As in the above case the incision was made along the lower edge of the ramus from angle to angle, the bone divided and dissected from its muscular attachments and removed. The edges of the wound were brought together with hare-lip needles, and in six weeks

his jaw was entirely healed. It was curious to observe the manner in which this man ate hard substances, such as meat or bread. He seemed to *hold* the morsel in the tongue, while with his upper teeth he soon reduced, or rather 'rasped,' it down; the tissues became consolidated, and will doubtless assume a fibro-cartilaginous character. No attempt at retraction of the tongue took place, nor have I yet seen a single instance, (though operating in some eight cases,) in which there was the slightest tendency to this accident so forcibly dwelt on by writers.

"Case 3. Lieut. A., Adjutant of Tenth Michigan Vet. Infantry, received a minie ball through the lower edge of the ramus of the inferior maxilla, comminuting the bone and tearing the soft parts so dreadfully that the tongue lay on the sternum, presenting all the appearance of a truly unpromising case. However, the bones were removed and the ends sawn off at the angles; the edges of the wound were brought together and retained by the interrupted suture. At the end of three weeks all had united except at the lower extremity of the right angle where the loss of substance had formed a fistulous opening. I loosened the surrounding tissues, having made an incision through the opening of about one and a half inches long, and bringing the edges that I had previously pared together, retained them in position with pins and the twisted suture. At the end of six weeks he was enabled to return to his home, his face perfectly healed, and his general health not at all impaired. A fibrous tissue appeared to take the place of the bone, and afforded considerable resistance to the upper teeth to masticate food against, but, as in the former case, the tongue seemed to be the chief agent made use of by nature to compensate for the loss of the lower jaw.

"The first idea that one gets on seeing the frightful wounds which occur about the face, is that of necessity the larger portion of them must prove fatal. Such, however, is not the case, as experience proves that death is the exception and recovery the rule."—(*Med. and Surg. Reporter.*)

Regeneration of Bone.—In a biographical sketch of Prof. J. R. Wood, of New York, DR. FRANCIS states (*Ibid.*) that "Dr. Wood has reproduced almost every bone in the body by treating with profound respect the periosteum. His museum contains all the experiments on the human patient that were practiced on birds and quadrupeds by Duhamel and Flourens."

"*Erectile Glossitis.* Reported by MR. CHAS. WILLIAMS.—A married woman, aged forty-five, was brought one evening to the Norfolk and Norwich Hospital, with her tongue protruding to the distance of one inch and a half from her mouth. On examination, the organ was found to be enormously enlarged; it quite filled the mouth and pushed out the cheeks. Articulation was impossible, and deglutition extremely difficult, indeed almost impracticable. The edges of the organ were deeply serrated, and on the verge of ulceration, consequent on the pressure against the teeth. The whole of the tongue was hard, red, and painful.

"It appeared she had caught cold, and four days previous to her appearance here she noticed that her tongue was tender, and somewhat larger than usual. It increased most rapidly in size, and in two days had attained the dimensions that were noticed when she applied for assistance. Cold was the only cause she could assign for the inflammation.

She had not injured it in any way, had taken no acids or poisons of any kind; it had not been stung, nor had she taken mercury in any form.

"Prompt treatment was adopted by making six deep incisions into the organ.* Blood only exuded, and that in large quantity. As she was incapable of swallowing, beef-tea enemata were often administered:

"The next day the tongue was smaller; it had receded one-half. She could swallow some milk.

"On the third day the organ was fairly within the mouth, and its apex behind the incisor teeth. From this time she progressed very well, and was dismissed a fortnight later.

"*Remarks.*—This form of glossitis, termed *erectile* by Dr. Salter, to distinguish it from the suppurative form, consists, according to that able physiologist, in an enormous and rapid distention of the organ by blood, by which it is rendered very large, hard, and stiff. It seems to be a purely idiopathic affection, and is most frequently the result of cold. It is an extremely rare complaint, and most usually terminates in resolution. Mortification has never been known to result in these cases."—(*Lancet.*)

"*Accidental Amputation of the Tongue.*—A boy, sitting on the shaft of a wagon, was jerked off, and his face crushed by one of the wheels. He received a compound fracture of the inferior maxilla, and the edge of the bone, turning inward, completely amputated the tongue at its base, with the exception of a few shreds of tissue. There was free but not troublesome hæmorrhage. He gradually recovered, and when he left the hospital, his method of speech, though very confused and mumbling, was by a little trouble intelligible."—(*Ibid.*)

"*M. Chassaignac's Drainage Tubes.*—The greatest and simplest and most generally useful of M. Chassaignac's special modes of treatment is the *draining tube*, and we doubt whether the professional mind on this side of the Channel is yet sufficiently alive to its merits. Most of our readers have heard of it—a little India-rubber tube perforated with holes, and introduced into suppurating cavities, in order to provide for the gradual, constant, and immediate discharge of all secretion without admission of air. Any one who follows M. Chassaignac for a few mornings, and hears him order *un peu de drainage*, will see the class of cases to which the method is applicable; and if he shares our good fortune, he will see some of the results, and hear a clear exposition of the very simple principles on which it is based. As the visitor follows from bed to bed among the chronic surgical cases attended with suppuration, he will see here a thigh, there the back or the breast, or possibly a tarsus swelled into that too familiar lump indicative of scrofulous caries, and in each case one, two, or perhaps half a dozen of the tiny black tubes passing right through the diseased part, in fact, (in the case of a diseased tarsus, for example,) wherever there is, or threatens to be, a sinuous opening, there M. Chassaignac orders *un peu de drainage*. As he passes round in his visit, the tubes are examined to see if they flow freely, and the edges of the aperture are just touched with a solution of lunar caustic,

* The steady application of cold, by means of ice or other agencies, is also very efficient in removing such conditions.—Z.

to supply which, the clinical clerk follows with a bottle of the solution, and a handful of wooden skewers armed with a little piece of cotton wool, which are rapidly used and thrown aside. This protects the orifices from ulcerative action, and from possible contamination from without. The principle of the drainage system is clear enough. A bone is carious: particles of the tissue in a state of decay are cast off, and mingled with the exudations of the surrounding parts, they form a petty swelling. This cannot be absorbed in most cases; and it acts as a source of irritation to the neighboring tissues, and tends to spread the morbid action of which it is the result. In ordinary practice, when it has accumulated in quantity to form an *abscess*, it is discharged by incision, if need be. But fresh collections form, and discharge themselves in other tracks, till the whole member is riddled with unhealthy sinuses. Here drainage does well what the best efforts of nature point to, but accomplish ill. It provides at once an exit for discharged and necrosed particles, through a track which the surgeon chooses, and which does not add to the severity of the original disease, for the hole made by the fine trocar, which introduces the tube, is a very slight injury. But this slight wound accomplishes all that can be done by a *free incision*. Again, instead of waiting till extensive disease has resulted in large abscesses or in a heroic operation of excision, or of gouging, these little tubes do the work of the gouge piecemeal and incessantly. We do not say that English surgeons are unacquainted with the tubes, but they do not know enough of their *preventive* functions. Surgical books contain cuts of gouges, and of *osteotrites* for cutting or grinding away carious bone, when the case has become a matter of life or limb; but they do not tell us to bore a tarsus with the little tube, which shall stop the mischief at its outset. As to the results, we saw at the clinical lecture patients presented cured, who had suffered from lumbar abscess following vertebral caries, and from various other scrofulous diseases of bone. The exposition of the method and of the result was admirably given, showing immense shrewdness and ingenuity, together with that thoroughly practical seeking for *results*, which we are apt, in these islands, to think peculiarly our own.”—(*Medical Times and Gazette*.)

“*Liquefaction of Laughing Gas*.—One of the most interesting objects at a recent *soirée* at the Paris Observatory consisted in the exhibition of the liquefaction of laughing gas, the protoxide of nitrogen, by M. Bianchi. This took place at zero Centigrade under a pressure of thirty atmospheres, the fluid issuing in a small jet from a strong metallic reservoir. Received in a glass tube, it retained its liquid condition by reason of the depression of temperature produced by evaporation, so that mercury being introduced solidified, and could be hammered like lead. Simultaneously, a body in a state of ignition, plunged into the atmosphere of the liquid, in which the mercury froze, burnt with a brilliant light. On pouring the protoxide into a small platinum capsule heated to redness, the liquid was found to retain all its properties while assuming the spheroidal state, and was still able to freeze mercury contained in little glass ampullæ. Finally, the liquid protoxide became solidified under the recipient of an air-pump, the temperature being reduced to 120° below zero Centigrade—the most intense cold yet obtained.”—(*Rev. Med. and Med. Times and Gazette*.)

"Mixture of Sulphur and Iodine.—At a recent meeting of the French Academy of Sciences, M. Meunier presented a note, the object of which was to explain two singular facts observed by Diezenbacher, namely, that a small proportion of iodine fused with sulphur at 180° gave lasting plasticity to the sulphur, and also that the action of iodine rendered the sulphur completely insoluble in bisulphide of carbon. Iodine fuses at 107° , and sulphur about 110° ; but a mixture of one part of iodine and ten parts of sulphur becomes liquid between 92° and 95° . A mixture of seventy parts of iodine and one of sulphur becomes pasty about 95° . The reason of this, according to the author, is that at a moderate temperature the mixture is converted into a compound of iodine and sulphide of iodine. The sulphide of iodine IS_2 , fuses at 90° , and, if slowly cooled, remains soft for a time; and a small proportion of the compound, fused with a large excess of sulphur, had the effect of rendering the latter soft and insoluble. M. Meunier found that bisulphide of carbon completely separated the two elements. The author accounts for the fact that one part of iodine will render 400 parts of sulphur insoluble by supposing that at a high temperature the iodine combines successively with every molecule of the sulphur, the compound being destroyed by the increasing heat, and in the end the whole of the iodine vaporized; the vapor, as it traversed the mass, having changed the molecular state of the sulphur. M. Meunier quotes a singular fact observed by Peligot, who found that the totally insoluble sesquichloride of chromium was instantly rendered soluble by the addition of $\frac{1}{10000}$ th of the soluble protochloride."—(*American Druggists' Circular.*)

Extracting Gold—“DR. F. CRACE CALVERT has lately proposed a method for extracting small quantities of gold, that may perhaps serve as a test also. Let the mineral in fine powder be mixed with one per cent. of peroxide of manganese, and digested with muriatic acid. Water should be added after twelve hours. If percolation is resorted to, the acid may be passed repeatedly through the powder, and then water till it ceases to dissolve out the metals. Nascent chlorine being generated by the action of the peroxide on the acid, the gold is said to be effectually dissolved. Old iron is now added to precipitate the copper in a metallic form; the liquid is then heated to drive off the excess of chlorine, and a concentrated solution of sulphate of protoxide of iron is added to precipitate the gold in a metallic form.

“Another method of precipitating gold is by adding solutions of perchloride of tin to the solution of chloride, which throws it down as a purple red precipitate. By passing sulphuretted hydrogen gas through the solution, sulphuret of gold will be thrown down—the presence of chloride of iron will not affect these results.”—(*Ibid.*)

Pure Copper.—“A pure copper may be conveniently obtained by dissolving commercial copper in nitric acid, and adding a little sulphuric acid to the liquid to render it slightly acid. A plate of iron is then immersed in the blue liquor, and the whole left in repose until it becomes colorless. The copper will now be found precipitated on the iron plate. It is to be collected and washed with dilute sulphuric acid, to dissolve any particles of iron that may be adhering to it, then washed with water to remove every trace of the acid. It may now be fused to obtain a solid mass.”—(*Ibid.*)

Petrification of Wood.—"Take equal quantities of gem-salt, rock-alum, white vinegar, chalk, and pebbles powdered. Mix all these ingredients; there will happen an ebullition. If, after it has ceased, you throw some wooden objects into this liquid, and leave them soaking for four or five days, they will be transformed into petrifications."—(*Ibid.*)

Solubility of Gold in Acids.—ARTHUR REYNOLDS, B.Sc., communicates to the *Chemical News* the following additional observations "on the solubility of gold in a mixture of sulphuric and nitric acids: A solution of chloride of gold, when heated in the same manner with sulphuric acid, forms a solution similar to that of gold in a mixture of sulphuric and nitric acids. It is precipitated by water. The solution, whether formed by heating gold with nitric and sulphuric acids, or by heating chloride with sulphuric acid, gives a deposit of metallic gold on continuing the heat, and when all the nitric acid is driven off the whole of the gold is deposited.

"Nitric acid in excess prevents the precipitation by water, but the gold dissolves better when the sulphuric acid has a little water with it, and only a small quantity of nitric acid."

"A New Method of Hardening Cast Iron.—A patent has just been taken out (in France) for a method by which cast iron may be made as hard as tempered steel. When the object in cast iron has been filed up and completely finished, it is to be heated to cherry-red, and plunged until it is cold again in a solution containing 1080 grammes (70 ozs. troy) of sulphuric acid, and 65 grammes (4 ozs. troy) of nitric acid to $2\frac{1}{2}$ gallons of water. The thickness of surface hardened is sufficient for ordinary wear, and the form of the object is not at all altered."—(*Cosmos and Franklin Inst. Journal.*)

Hardening Steel.—"DR. JOULE described, to the Manchester Literary and Philosophical Society, the process he employed to harden steel wires for magnetic needles. The wire was held stretched between the ends of two iron rods bent into a semicircular shape. The free ends of the iron rods could be placed in connection with a voltaic battery by means of mercury cups. Underneath the steel wire a trough of mercury was placed. When the ends of the iron rods dip into the cups the current passes through the wire, heating it to any required extent. When these ends are lifted the current is cut off, while at the same instant the heated wire is immersed in the trough of mercury."—(*Chem. News.*)

Cementation of Iron.—"M. CARON sent another memoir to the Academy of Sciences on the '*Cementation of Iron by Carbonic Oxide and by Contact with Carbon*,' and this time quotes Dr. Percy's experiments in support of his assertion that carbonic oxide will not cement iron. He still insists that cyanogen is the active agent in the conversion of iron into steel, and quotes experiments to show that carbon destitute of alkalis has no effect on iron in contact with it. But when an alkali is supplied, and atmospheric air admitted, cementation is facilitated. Iron also heated with this inactive carbon in an atmosphere of ammonia is quickly cemented."—(*Ibid.*)

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, MARCH, 1865.

No. 8.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Caries and Necrosis of the Alveoli and Maxillary Bones.—It has been well said by a recent author (*Erichsen*) that the transition from caries to necrosis is easy. Caries may be regarded as the granular disintegration or molecular death of the osseous tissue, conjoined with suppuration of the surrounding healthy parts; while necrosis must be looked upon as the death of the osseous tissue as a whole, a condition, indeed, closely resembling that of gangrene of the soft parts. While caries, however, chiefly affects the cancellous structures, necrosis is met with in the compact tissue of the bone, and far more frequently occurs in the shafts than in the articular end of the long bones. The different bones are affected by necrosis, with varying degrees of frequency. Not uncommonly the phalanges of the fingers from whitlow; the cranium from syphilis; the lower jaw from the emanations evolved in the manufacture of phosphorus matches; and the clavicles and ulna from injury or constitutional causes, are found affected by necrosis. It will be seen that some bones are more liable to necrosis than others, according to different authors, and the kind of bone attacked may lead to a probable explanation of its cause.

It is held by all writers, as far as we can learn, that the most prominent constitutional causes should elicit first attention,—*cachectic* conditions of the system, which may result from a scrofulous or syphilitic taint, or the debility following typhoid or typhus fevers, or protracted disease of any kind which has interfered much with the nutrition of the system; everything which tends to lessen vital force renders the bones of

different parts of the body liable to disease from slight local causes. The long list of varieties of diseases of the bones of the system, according to the kind of bones in which the diseases occur, and their constitutional and local causes, of necessity furnishes too large a subject to be treated of in the pages of a dental journal. It is positively necessary for every dentist to understand the nature of the different diseases of the bones, that he may recognize them when they appear about the jaws, but it does not follow that if he understands them that it is his business to treat them. No dentist is sufficiently isolated from physicians and surgeons that he should feel it to be his duty to humanity to do everything which he understands or is capable of doing; he should know enough to be able to comprehend the limits or boundaries of his own specialty. It seems to be a principle, admitted by all intelligent people, as well as all branches of pursuits in life, that subdivision of labor, in whatever department, conduces to the best results; it is so regarded in the learned professions as well as in other avocations. It is true that we should understand what constitutes a dentist: excellence in the *manipulative art* of our profession is not sufficient to constitute a dentist; and while it is necessary for him to grasp the whole range of medicine and surgery, his practice should be confined to the duties of his office in the special diseases of the teeth only. If he be called beyond that by the medical man or surgeon, it is his business to obey and act his part, and that is a compliment to him; but if he seeks that which belongs to other practitioners, he encroaches upon their field of duty and means of livelihood just as much as if the surgeon and physician would carry with them the forceps and pluggers to fix teeth for the sick on whom they treat, to the detriment of the dentist.

Caries can scarcely be considered without, at the same time, discussing necrosis of the bones. Caries, according to Erichsen, properly means a disease of the bone, characterized by increased vascularity, softening, and ultimate disintegration of the osseous tissue. On examining a portion of carious bone it will be found to be porous and fragile, of a gray, brown, or blackish color; in parts broken down in softened masses, and at others hollowed out into cells, which contain a reddish-brown and oily fluid. In syphilitic constitutions it is apt, however, to affect the surface of the bone, disintegrating and eroding this in a remarkable manner. This condition has been described by Stanley as true *ulceration of bone*, and he regards it as distinct from caries, and analogous to ulcers of the soft parts. He says the disease does not penetrate deeply, but leaves the surface rough and porous, with a good deal of inflammation in the soft parts around the affected bone. This condition of things we frequently meet with about the superior maxillary bones; malar, palatal, and nasal bones in the treatment must not be hurried.

Necrosis may occur from intense inflammation of the body of a bone, denudation of its periosteum, by injuries. We have seen cases occur in

the maxillary bones by bruising the parts with the fulcrum of the key instrument, or where portions of the alveoli have been broken down by too much lateral force in extracting teeth; this cures itself by exfoliation in a short time, except in vitiated constitutions.

(To be continued.)

MICROSCOPIC STRUCTURES OF TEETH.

BY WM. H. ATKINSON, M.D.

Read before the Society of Dental Surgeons of New York City.

THAT some general characters, capable of being determined in some degree by the unaided natural vision, are distinguishable among the structures of which teeth are composed, will not be denied; but that anything like satisfactory knowledge of the histological and anatomical elements of teeth can be made out without intelligent persistent use of the microscope, will not be asserted by one at all cognizant of the beautiful and intensely interesting metamorphoses, through which all mammalian teeth pass from unpronounced chaotic mass to well-defined organs, of definite proportions in size and almost adamantine solidity, fitting them for the uses for which they are destined in the animal economy.

We often hear it said, that it is all very well for the naturalist to busy himself with histological studies pertaining to the vegetable and animal kingdoms, but that dentists had much better reserve the time and money, the expenditure of so much of both of which is involved in such fanciful acquisitions, for the more practical and useful acquirements of how to perform the daily duties of the arduous profession they have determined to follow.

Now that a well endowed man may learn to extract and insert teeth without a knowledge of even the three primary constituents of the hard portion of the human teeth, we have proof in many living and flourishing witnesses. And that men of fine manipulative ability, and equally devoid of structural knowledge of the teeth with those above cited, may learn to excavate and stuff in some sort the cavities that disease has produced in the teeth, is also lamentably susceptible of manifold proof, to the sorrow of many a confiding patient, and to the lasting disgrace of all members of the dental profession who either practice or excuse the ignorance, laziness, and wickedness in which such habit has its origin and growth. Men who know nothing of the delicacy of arrangement and crystalized frailty of the rods of enamel, by which nature has chosen to surround, for the purpose of protection, the less friable and less solid dentinal structures which compose the greater portion of the crown of each human tooth, are slow to perceive and reluctant to put in practice the painstaking nicety by which every cavity should be cleared of disintegrated substances, and perfectly adapted for the reception of such a filling as

will completely restore the contour and integrity of the organ by which it alone can be made to subserve the highest purposes of use in the human mouth.

If I were asked for a recipe by which to purge our body of slovenly and unworthy members, my formula would be short but thoroughly efficient. I would require of each applicant for a field of practice in dentistry, to pass a disinterested board of examination, who should be sworn to admit none to practice but those who could unravel the whole germination, growth, development, and consolidation of the teeth and other structures of the body; and delineate the more prominent pathological conditions of the entire body, with the physiological and pathological nutrient acts of the teeth in particular. Also demonstrate their capability in arresting pathological states, and their skill in substituting portions of teeth or whole or partial sets in such manner as to subserve the purposes of the natural healthy organs. Then we could advance with an increased rapidity toward the highest ideal of prophylactic and prosthetic exhibitions of knowledge and skill, being no longer abecedarians covering first principles, but skillful dispensers of the stronger doctrine of life and being.

Structures is an English noun, plural, from the Latin noun "*structura*," itself from the Latin verb *struo-structus*—to build—and signifies mode of building; make; arrangement; a building; edifice; fabric.

In anatomy: the arrangement of different tissues or organic elements, of which animals or vegetables are composed. "Microscopic structures of teeth," then, will be structures so minute as to require strong magnifying powers to discover and display them, no less than a specific skill in so preparing them as not to destroy the structures themselves nor their proper relation to each other. *Structures* of teeth are the materials, amorphous or defined, out of which the teeth are built.

Teeth, like all other bodies, are objects of "*creation*" in their *elements*, and "*formation*" in their *constituents*. These may be divided into adventitious, deciduous, or temporary, and regular, permanent, or persistent in character.

All teeth are the result of the process called "dentification," which is the work of type which calls to its aid the great organizer, oxygen, in bringing them from the formless state to a definite degree of oxidation of their animal and earthy constituents, which is but a series of degrees of oxidations more or less perfect from the softest filamentous denticle, providing animalcules with prehensile organs to the most complex and well solidified structures entering into mammalian teeth. Hardness, expressing the degree of satisfaction of type with habitat in each and in all, the type being unwilling to leave habitat in the exact ratio of oneness or singleness of affinity! Hence the *enamel*, of all the structures composing teeth, is the most difficult of disruption and solution, because of the simplicity and satisfaction subsisting between its constituents.

The alphabet of tissues, like the alphabets of languages, must be regular in the successive enumeration of the letters (elements) composing it, or we can have no definite and ready methods of codification in dictionaries in which to record the definitions for instruction or settlement of differences of meaning of terms. Hence, beginning at the real beginning, involves, as already hinted, a knowledge of creation, which is the production of ideals or types of plus and minus quantity, the disintegration by positing and mutual interpenetrative solution of which, constitutes vivified germs, enfolding within themselves the exact equation of plus and minus ideas or types, which, by this process, becomes the measure to which evolution of the germ is limited by reason of the correlations of force inherency therein. As alphabets are based upon natural sounds, which they are claimed to represent, so must our principle of development, or alphabet of tissues, also be based upon the *plan* of procedure by which nature produces and sustains in being for definite periods the deciduous and permanent constituents of the bodies whose microscopic structure (anatomy) we are now considering.

Alphabet: plasm, (infusorial mass, mucous mass, etc.,) by successive aggregations, out of which arise: *atom, particle, molecule, granule, simple cell, nucleated cell, and nucleotated cell*; changes or mutations of these produce *filaments* out of which *tissues* are woven of various patterns corresponding to the *idea* or *type* and *function*, by which, and for which they are built, from simple to compound *membranes*, from which result in turn, *enamel, dentine, secondary dentine, and cement*, all of which are but degrees of *calcification* of various portions of that which is known by the name of *pulp*, itself a complex body, composed of *neural, vascular, and connective tissues*, holding continuous connections to the general system of blood-vessels and nerves, thus deriving its supply from the same sources or centers as do all the other organs of the animal economy, and making the tooth amenable in the degree of life endowment of its various tissues or structures to partake of physiological and pathological activities in common with the rest of the body. A close scrutiny of the evolution of teeth has revealed the following serially deciduous bodies, stages, or changes, through which the type struggles to pronounce itself in a completed mammalian tooth: 1. granules; 2. cells; 3. grooves; 4. follicles; 5. sacs; and 6. membranes; all of which depend upon a general circulation, composed of three distinct branches: two are real circles, and one only a half circle; what is meant by real or true circle, or round of current, is afferent and efferent streams, to and from a center; a semi-circle, or partial or half round of current or stream, is efferent or afferent without direct connection with its other half current, in vessels of like structure and character. These three branches in the human body consist in: 1. neural; 2. vascular; and 3. sympathetic currents. When these special circulations are in full play we have the general circulation harmoniously

produced and carried on, bringing the nutrient pabulum to the various points for cell appropriation. When the foods are all prepared, ready for use, and in position, they consist of "infusorial mass," or "plasma," "nerve mass," "mucous mass," or sea of nerve aura, in which decussations of galvanoid or vital currents arrest infinitesimal portions of the mass at the points of crossing, thus producing granules, the accumulations of which produce simple inter-cellulæ granular mass, or, by continuations and repetitions of these currents the granules aggregate into: *first*, nucleoli, which now become points of centripetal and centrifugal currents, each of which is not long in producing; *second*, a nucleus around the nucleolies at a certain distance therefrom, enclosing the nucleolies in a sort of zone, as it appears to the eye, but really a hollow sphere in which the nucleolies occupy the center, surrounded with a transparent sphere, also hollow, like the nucleus, but intervening between these two bodies as atmosphere to the former and endo-atmosphere to the latter, through which the nutrient currental diastole and systole, or breathing of the nucleolies and the nucleus, is made not only possible but easy. Another hollow sphere of greater or more reduced size, as the case may be, encloses more or less of this inter-cellulæ granular mass within a delicate pellicle of hyperoxidized hydrate of carbon, as it is, constituting the cell wall proper, and we now have the completed cell of highest endowment, (viz.: wall, parenchyma, nucleus, and nucleolus,) out of which threads or filaments are produced, of which to construct tissues under the direction of typal pre-determination. Each distinct tissue is distinguished by the characters and arrangement of its specific or distinctive primal constituent under the name of cell.

At a future time I will take up and delineate the various cells concerned in the formation and nutrition of teeth. The principal structures of teeth of the mammals are composed of enamel, dentine, secondary dentine, and cement; each of which has distinct or characteristic cells, by which minute portions of these structures may readily be recognized.

PLASTIC FILLINGS.

BY A SUBSCRIBER.

EVERY practitioner finds now and then a case of a tooth which it seems unadvisable to extract, and which cannot be filled with anything except some plastic material, by the use of which the tooth may be rendered useful for a considerable length of time.

Now, I well know that I shall be met by some with the assertion that if a tooth is worth filling at all, it should be plugged with gold; and I fully appreciate the great superiority of gold as a material for filling over everything else. Yet there are numerous cases, especially in country

practice, where, from lack of means to pay for gold fillings, many teeth with very large cavities would have to be unconditionally surrendered to the enemy—decay—were there not some easier and less expensive means of resisting his attacks. But we have so many different kinds of plastic fillings that it seems important to try and select the one which shall most perfectly answer the purposes of a filling with the least disadvantages in working. And here allow me to give a brief report of my experience with different kinds of coarse filling. Of the osteo-plastic or bone-fillings, I must express a decided preference for Roberts' "Os Artificiel," which, if everything is favorable for keeping the cavity perfectly dry, will make a tolerable good filling for a frail tooth, provided it is not inflamed, in which case I have found it to excite so severe pain as to require its immediate removal. I have experimented with an article called Campbell's amalgam, which, in my opinion, is the best amalgam extant. When properly prepared it sets quickly, and the metals composing it so perfectly absorb the mercury that the microscope fails to discover the least particle of free mercury, thus leaving none to permeate the minute cells or pores of the dentine to discolor it or give it a blue color so common from amalgam fillings.

It is not my aim to praise or decry any particular preparation, but simply give the result of my own experience, hoping that it may lead to further research, thereby enabling the profession to find out and make use of the best means of benefitting their patients and advancing their own professional reputations.

SYRACUSE, January 26, 1865.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

REPORTED FOR THE DENTAL COSMOS BY R. J. HOFFNER, D.D.S.

(Continued from p. 382.)

The subject of the evening, MESMERISM, was then taken up.

Dr. McQuillen said that, as a general thing, this subject had been regarded as one possessing little or no claims to consideration by men of science. Learned bodies, such as the French Academy, it was true, had appointed committees to investigate its merits, with such men as Franklin, Bailey, and other savans upon them; but their reports only tended to strengthen the opposition on the part of scientific men. Notwithstanding all this, the singular phenomena which unquestionably have been produced under the influence of MESMERISM, OD-FORCE, BIOLOGY, or whatever other term may be applied to it, and which ancient superstition and modern charlatanism have in turn availed themselves of, has however

attracted the careful, candid, and impartial attention of such minds as Dunglison, Carpenter, Mayo, Mitchell, and a few others eminent in the field of science. These, while by no means admitting the absurd pretensions of enthusiasts, yet recognize, under the term "mesmerism, phenomena which appear to have as just a title to the attention of the scientific physiologist, as that which is possessed by any other class of well ascertained facts."* To the dentist, in addition, this subject recommends itself, from the fact that operations on the teeth, which are usually painful, have been performed under its influence without the consciousness of the patient.

In reviewing the history of mesmerism, the close relation which its phenomena bear to some of the arts practiced by the priests in the ancient temples of Egypt, Greece, and Rome, becomes quite evident. Veiled as it can be in an air of mysticism, it is more than probable that the priests used it when operating upon the superstitions of the people, through the oracles of their deities. Employed, more or less, during successive ages by designing men, eventually Mesmer, in 1766, gave the subject a world-wide notoriety in his effort to apply it to eradication of all forms of disease. Possessing ability, he exercised as an enthusiast a wide-spread influence over not only masses of ignorant people, but, in addition, large numbers of intelligent and highly respectable persons were duped by his pretensions and those of his followers. There is a remarkable power which some men possess over their fellows, and by which they can readily control those who are susceptible to their influence. This is apart from mere respect, and is an influence controlling even the actions of men. Such power was possessed by Napoleon and other men, who have exercised a preponderating influence over the destinies of their fellow-beings. Developed to a considerable extent in Mesmer, and applying it in the direction in which he did, he attributed his influence to the passage of a magnetic or electric fluid from the magnetizer to the subject experimented on. This absurd theory has been objected to very properly, and the phenomena accounted for by the statement that, under the influence of a magnetizer, "impressible individuals may have irregularities of nervous distribution induced through the medium of the senses, especially through those of vision and touch."† This, however, is rather a statement of a *fact* than an explanation of the *cause* of the phenomena. Dr. McQuillen thought that the proper direction to look for the solution of this intricate question was the recent and philosophical recognition of the *correlation, conservation, or unity of forces*; in which heat, light, electricity, magnetism, etc. are no longer regarded as subtile fluids with peculiar properties, but simply

* Carpenter's Human Physiology, p. 826.

† Dunglison's Human Physiology.

as forms of energy which, with protean facility, are capable of mutual conversion. Vital force is but another form of this great unity of forces, and while it is perfectly absurd to talk of magnetic or electric fluid passing from one person to another, the possibility of a person possessing a large amount of vital force or energy infusing a portion of his superabundant capital into those with whom he comes in contact, and who have but a limited share, is not only reasonable, but is daily manifested in the ordinary commerce of life. One thus surcharged employing the ordinary manipulations which the magnetizer has recourse to, could very readily induce in an impressible person the phenomena attendant upon such efforts. The hysteroid or cataleptic state into which persons are thrown under such circumstances, is by no means an unusual condition for some individuals to lapse into and remain for a considerable period without an assignable cause, other than attributing it to irregularity of nervous action.

Reference was then made at some length to the state of trance in which persons occasionally fall and remain to all appearances dead for days, and in some extreme cases for weeks. Somnambulism or sleep-walking, hysteria, the convulsionists of St. Medard, and the hysteroid state frequently induced in those suffering under nervous irregularities at religious revivals and camp meetings, by the eminently exciting nature of the sermons delivered on such occasions, were also spoken of; and persons presenting such manifestations regarded as markedly susceptible to be influenced by the will or force of others, and therefore liable to be easily thrown into what is called the mesmeric state. Hypnotism, or the possibility of self inducing this state by looking at a bright object held in front of and a little above the eyes of a person, was also alluded to.

The practical application of this subject to dentistry was not as limited as many might suppose; truly few persons through its influence could be rendered insensible to the painful operation of extraction, and in this respect it was remarkably circumscribed; but, in the general routine of practice, it could be brought to bear with decided benefit to patients and operators. The marked influence which some practitioners exercise in this way over their patients enables them to accomplish results which other operators have failed to secure.

Mr. Rogers had seen some public exhibitions where the effect of the mesmeric influence had been manifested. He had viewed them, however, as merely curious performances, without any relation which they might have as scientific subjects. A case subsequently came under his notice of a patient who desired the removal of a number of teeth. She requested that either chloroform or ether be given her, but neither he nor the attending physician deemed the administration of an anæsthetic advisable. An individual, (an ignorant man,) who was at that time traveling in that section of country, and who was a magnetizer, took

the case in hand, and in a short time he had the patient in a condition to be operated upon. She was mesmerized, and twenty-nine teeth and roots were removed without the least evidence of pain. She came out of the mesmeric state with no supervening ill effects, and at a subsequent sitting she was again mesmerized and the remaining teeth extracted.

Mr. Emery said that he had seen a little experience in the direction of biological science, though never in its adaptation to any practical purpose. At a time when the excitement regarding mesmerism was rather high, he had been influenced to such an extent that his limbs were entirely paralyzed; this was a surprise to him, as he had previously entertained no idea that he could thus have been acted upon.

Dr. Hoffner stated that his experience with mesmerism had been at a time when it possessed but little interest to him, except as a curious exhibition. While there were many who utterly disregarded the assertion that such an influence could be exerted, it seemed strange to him that persons, well known, should place themselves in ridiculous positions in order to gratify the amusement of a party of spectators. He had seen those with whom he was acquainted go through performances, directed by the will of the operator, such as would have rendered them supremely ridiculous had they been conscious of what they were doing. In so far as he was concerned, though often subjecting himself to the manipulations of magnetizers, he had never been affected, all attempts to render him in any way unconscious having failed; though his friends had been subjected to the power of the operators, and made subservient to their wills. The subject of mesmerism was closely investigated by the late Dr. J. K. Mitchell, and in his essay upon the subject he states, in confirmation of the fact that the sleep differed from normal sleep, that the extremities, while under the magnetizing influence, were frequently clammy, while no such manifestation is to be found during natural sleep.

The most important consideration, however, is the practical application which can be made of this subject. It was asserted by reliable scientific men, that during the mesmeric state, operations of a severe nature had been performed without evidence of pain. This was a fact which he had never had the opportunity of testing, but thought it worthy of consideration, as it might be rendered useful in such cases as that mentioned previously by Mr. Rogers, where the usual anæsthetics were contraindicated.

Dr. McQuillen having been asked what connection there was between spiritualism and mesmerism, said that the phenomena attributed to the former were undoubtedly to be referred to the influences of which he had already spoken. He then related a case, which he said Dr. Flagge could corroborate, of a man claiming to be a medium, whom he had met, in company with Dr. F. and another friend, Mr. MacDowell, some years before at the Ashland House, in Philadelphia. While in the presence of

this person he willed him to remove a diamond pin from the shirt of Mr. MacD. and place it in his own shirt; this was done. He then willed that the man's hand should be placed in his inner coat pocket, remove a visiting card case, lay it upon the table, take from it a card, and place the card upon the lap of Mr. MacD. This was performed without any hesitation. He would not undertake to account for these things, but stated the facts as he saw them. No doubt some persons would have regarded them as the unmistakable evidence of spiritual influence; to him, however, they were nothing more than singular phenomena.

Dr. Kingsbury said it might be asked what practical benefit can be deduced from this subject. Whether these mesmeric influences are events flowing from certain or are due to peculiar characteristics of the organism, it would be well to investigate. They are mysterious, but surely not more so than the various operations of the organism. One of the phenomena is that of coma—a state which seems to differ from ordinary cerebral pressure, and it is in this that its practical advantage lies. The subject of mesmerism was one to which he did not give full credit, until parties known to him, and of undoubted veracity, were subjected to its influence, and gave it as their experience that they were unable to control their own actions. A young man, an acquaintance of his, was mesmerized by a proficient, and exhibited all the usual phenomena of a person in the mesmeric state. Subsequently he attempted some experiments himself, and found that he was able to accomplish satisfactory results. Being called upon at one time to extract a tooth for a young lady, he did so, with a subsequent supervention of an unpleasant flow of blood into the throat, producing asphyxia. Shortly afterward, having to extract another tooth for the same lady, he was requested to mesmerize her, which he did, and removed the tooth, with no unpleasant symptoms and no pain to the patient. He mesmerized her again, subsequently, in the presence of a number of physicians, and removed a diseased tooth with the same success. This same lady was afterward mesmerized by him in the presence of some of the most distinguished men of New Jersey, among whom was the late Judge William L. Dayton, recent Minister to France. Previous to leaving his (Dr. Kingsbury's) office, Judge Dayton had disarranged some of the articles of furniture, placing one chair upon another, the poker upon the mantle, etc. When the young lady was magnetized she was placed in communication with Judge Dayton—how he could not say—and the Judge then desired her to visit mentally the room they had previously left, which she did, and described minutely what she saw, distinctly mentioning the peculiar disarrangement of the articles of furniture, though she had previously had no intimation of what had been done. He had also induced the clairvoyant condition in a young man, a patient of his, of whom, when in the mesmeric state, he had complete control.

Adjourned.

A monthly meeting of the Odontographic Society was held, Tuesday evening, February 7th, at the Philadelphia Dental College, Dr. J. H. McQuillen in the chair.

The following gentlemen were elected members of the society.

Honorary Members:—Prof. A. Kölliker, Würzburg, and Prof. Thomas H. Huxley. F. R. S., F. L. S., London, Eng.

Corresponding Member:—Chas. James Fox, London, Eng.

Active Member:—Dr. Wm. P. Haywood.

DENTAL CARIES was chosen for discussion.

Dr. Flagg said that his views upon this subject were eminently pathological. He regarded it as analogous to caries of the bones and mortification of the soft parts. Theories had been opposed to this view, but they were not satisfactory to his mind. He believed that taking irritability as the basis, the organic and inorganic structures of dentine are acted upon just as the organic and inorganic structures are acted upon in other parts of the body. With respect to the decay of the teeth, he regarded it as due to chemical irritation modified by vital action. He was not opposed to the galvanoid theory, which accounted for the decay of the dental organs by supposing that different and opposing electric currents influenced the disorganization of the dentinal structure.

Mr. Elliott said, that as the discussion included the preparation of cavities for filling, he would make reference to certain cavities of decay where he had found difficulty in introducing a good filling. These were small spots between otherwise perfect central incisors, where disorganization had progressed but little. Such cases can be reached with the file, but this treatment is not always judicious. In these cases he always filled as well as he was able and awaited the result.

Dr. Flagg adopted the following plan in treating these so-called pin-hole cavities. He separated the teeth and drilled diagonally into the cavity from the labial or palatine surface, making such an excavation as would hold the filling. Then when the teeth came together the filling was perfectly concealed.

Mr. Hurlbut said that in cases such as these he adopted a course somewhat similar to that mentioned by Dr. Flagg, separating the teeth and drilling into the cavity until it was so shaped as to retain a solid filling.

Mr. Roberts said that cases such as these had occasioned him considerable trouble. He usually gained access to them by wedging until the requisite space for filling was obtained. He regarded the use of the file for cutting away such cavities as injudicious, and rather than use it he would lose the patient. He used the file, however, when the decay had progressed so far that it did no harm to take away the rough and thin edges of the cavity, in order to secure a smooth and slightly surface, besides allowing a strong wall for the retention of the filling. In excavating he

depended mostly upon hatchet excavators; uses sharp drills when he can to facilitate undercutting.

He had noticed in these small cavities the most extreme sensitiveness, just above the union of the enamel and dentine, and in deep cavities this sensitiveness exists just where this union takes place along the sides. This sensation he had been induced to believe arose from the injury done to the termination of nerve fibrella anastomosing at this point, just as the terminal filaments of the nerves unite at the tips of the fingers. True, it has been urged, that the pulp of a tooth will drop from the canal, indicating no connection with the dentine, but this nerve canal is lined by a closely adherent periosteum, and is it not likely that the nerve filaments which enter the tooth substance may come from this periosteal lining?

Mr. McManus stated that in filling cavities such as those mentioned by Mr. Elliott, he separated with the wedge, and drilled and cut away from the palatine surface, so that the labial surface shall remain intact.

In the preparation of ordinary cavities he uses creosote almost invariably, to obtund sensibility, and he thinks with a fair share of success. This method had been objected to as useless, but he has had results from the treatment which would induce him to continue the practice. In applying the creosote, he dried out the cavity, then saturating a small pledget of cotton, placed it in contact with the sensitive surface, taking care that none of the creosote came in contact with the gums of the patient. In excavating approximal surfaces, he believed in a free separation, and this he accomplished, where practicable, as much as possible with the chisel.

Mr. Bowers said he had been taught to use the file freely in filling teeth, in order to shape the cavity, using the chisel afterward to secure a good opening. His experience justified him in stating that he had seen teeth filled after this manner, which had stood the test of time. He could not, however, reconcile himself to this practice, as he considered that an unjustifiable loss of tooth structure was the result. He therefore resorted to the wedge, and considered it preferable where it could be used. In sensitive cavities he had seen no occasion for the use of creosote. Chloride of zinc had been his almost universal application.

In cases where he had treated teeth, and the patient would not pay for a good fang filling, he had carefully removed the nerve and left the canal open, while the cavity of decay was filled, and in these cases he had seldom seen an unfavorable result. He introduced this subject in order to learn the practice in such instances, of those who were present, and trusted that if they had tried the experiment of filling teeth with the fangs unstopped they would give the results.

Mr. Perry had filled some teeth in the manner just spoken of. About two years ago he treated a tooth for a lady, and after removing the pulp, filled the cavity of decay, leaving the canals untouched. He saw the case but a short time since, and no difficulty had been experienced.

He had used creosote, he thought, with some success. An application of aqua calcis which had been made to a sensitive tooth, and left there while another cavity was being excavated, had materially lessened the unpleasant sensation in the first tooth during its subsequent excavation.

Dr. Henry regarded it as a necessity that plenty of room be obtained in filling approximal cavities. In the use of the file, when care was taken to polish the surface afterward, he had noticed no untoward results.

Dr. McQuillen referred briefly to the various theories with regard to dental caries,—the inflammatory, the chemical, and the chemico vital. He considered dental caries as arising from perverted nutrition. In so far as nutrition is concerned, four things are requisite. There must be a due supply of blood; that blood must be of a proper quality; the part must have a proper capacity for absorption, and there must be due nerve force. Suppose then nutrition becomes perverted, there is consequently a predisposition to disease established. Certain destructive influences are always being exerted upon the system from without, and this is particularly true with respect to the teeth. For instance, acids are taken into the mouth, and being brought in contact with the teeth act deleteriously upon their structure. He does not believe in the statement that vitality prevents chemical action. Thus the gastric juice is said not to act upon the living stomach, while it will destroy the tissue in the dead stomach. He contends that it does act upon the living organ, but there is a reparative power, constantly at work, which reproduces that which has been destroyed. Applying this to dental caries he regards vitality as resisting decay, in that an impression is made upon the pulp and a greater amount of calcareous matter is carried to the dentine and deposited in the dental tubuli. An effort is thus made on the part of nature to arrest the progress of decay, which however may prove abortive.

In filling cavities such as had been mentioned, he would not use the file if he could help it, but considered a judicious use of the file serviceable. He had teeth in his mouth which had stood for eighteen years after being filed, without any symptoms of decay. If the dentine be perfect, having no defects, it is as little liable to decay as the enamel.

In obtaining access to these small cavities, he prefers to use the wedge, and places it in position with the mallet. He does this in order to get through with the operation as speedily as possible. After driving in the wedge he cuts away from the tooth as much as is sufficient, either with the file or chisel, preferring the chisel, because the file is looked upon by the patients as an unjustifiable instrument, and, while they submit to the use of the chisel, they are averse to having the file employed. In preparing these cavities he prefers the excavator, and makes the cavity such as can be readily filled.

Dr. Flagg said that he had before referred to what were pin-hole cavities in reality. When they became larger he would deem it unjustifiable to file them away. He then drills, either from the labial or palatine surface, and fills the cavity thus made. In incisors and cuspids he does not chisel or file away any more than is possible, regarding too little filing, however, as worse than too much.

In the treatment of the roots of teeth, he believes it to be the better plan to have a stopping in them, as in company with his friend, Dr. McQuillen, he had experienced in this direction to his entire satisfaction.

With regard to wedging, he usually adopted a little plan of his own, of which he had seen no notice made. A small piece of soft pine wood was placed between the teeth and gently pressed upon; then while another tooth was being prepared he could introduce another wedge, which would loosen the first, and so on, until sufficient space was obtained to fill the approximal cavity, and this could be realized in a comparatively short period of time.

Dr. Hoffner said that if dental caries were due to inflammation, then the introduction of a material in contact with this inflamed surface ought to be productive of irritation rather than tending to allay it. This statement, which he had met with in Harris, seemed pretty conclusive evidence that inflammation was not the cause of caries of the teeth.

It is somewhat singular that the last edition of Harris' Dental Surgery, the universal text-book of the dental student, should, however, adhere to the chemical theory as explaining the cause of the decay of the dental organs, since that view has been abandoned by the leading men of the profession, and the chemico-vital theory accepted as the one which gives the best idea of this pathological condition.

With regard to the filing of teeth, he had seen many which had worn for years after having been filed into the dentine; and it is a well-known fact that among the nations of some of the barbarous countries, the approximal surfaces are filed down to a point, in order to give the face a savage aspect, yet the statement of travelers is that the teeth of these people are seldom attacked by decay.

Mr. Emery stated that he saw a number of skulls only a few days before, in which the front teeth were filed down to points, resembling somewhat the edge of a saw, yet the structure was perfectly sound.

Dr. McQuillen, in the case of teeth from which the pulps have been removed, invariably fills the pulp cavities with gold. He recognized the right of practitioners to use other materials if they saw fit, but having met with a fair share of success with gold for about eighteen years, he saw no reason for discontinuing its use.

Adjourned.

NEW YORK SOCIETY OF DENTAL SURGEONS.

REPORTED PHONOGRAPHICALLY BY F. M. ODELL.

Wednesday, April 6th, 1864.

MECHANICAL DENTISTRY continued.

Dr. Aaron A. Pierce takes his impressions always in plaster; but for partial cases makes a cup of wax by first taking the impression with wax as follows: Press a piece of soft wax up into the roof of the mouth and around the teeth; then fit a piece of wire into the wax running around the ridge, pile on more wax outside to hold the wire firmly and strengthen the cup, cut away the wax impression up to the necks of the teeth for the depth of about one-eighth of an inch, fill up with plaster and take the impression, observing if the plaster has gone well up around the necks of the teeth; if it has not, lift the lip with one hand, and, by aid of a spatula in the other, put more plaster in just where it is needed; the patient meanwhile holding the impression up with the thumb; after two minutes, the thumb may be withdrawn and the impression will stay up of itself.

After a pause in the proceedings, no person seeming to have anything further to say, Dr. William H. Atkinson said, I wish the time had come, as I believe it certainly will, when there will be nothing further to say upon the subject of mechanical dentistry. Thinks that those who have that ideal for it which has been shadowed forth, should have redeemed it in discussion. I do not eschew artificial teeth; we know too little of the particulars of our best ideal of artificial dentures! Enough has been said to have brought out more of inquiry. I have yet to see a piece of work which shall be beyond the reach of improvement in more points than one! We have one in the room who has high ideas on the subject, and who should have something to say in relation thereto. Much of what has been said has an aspect of truth, and much has an aspect of untruth. We must be more in earnest! There has been much said as half-developed truth. Operative dentistry is useless without mechanical ability. I made an operation yesterday, which might be called mechanical dentistry. It was in the end of a right superior cuspid which was bifid. The lady came to me to have it extracted; but as that should be the last resort, I drilled it through, took the measure, and had a T-shaped piece of gold made to clasp over the walls of the tooth to enable them to withstand the pressure; then, by means of a nut and screw, fastened the T of gold on to the tooth, and finished the filling with gold foil. This is the fourth or fifth time in which I have succeeded in making such operations. Am more in love with saving the natural organs than with placing artificial teeth in the mouth; advocate a division of mechanical and operative dentistry. Have erred often in at-

tempting to save teeth which it was not possible to save, but had learned by those blunders.

Dr. Hawes inquired if Dr. Cassell's question had been answered to his satisfaction.

Dr. Cassell said, it had not, and restated the question, which was, How to overcome the difficulty in taking an impression of the palatine arch?

The doctor then proceeded to say that it is absolutely necessary in some cases to fit the clasps to the teeth. A few years ago Dr. Roberts stated that he fitted three vertical wires to a tooth so that the clasps should not touch the tooth. I do not believe in some of the things which have been employed in artificial work. Thirty-two years ago I used wax for impressions. About that time Dr. Villers introduced porcelain teeth. Dr. Franklin on a former occasion thought continuous gum was the ne-plus-ultra in dentistry, now it is (with him) vulcanite. I should like to see the gentleman who can take an impression so as to get a perfect fit; and as far as altering cases to accord with people's notions is concerned, I do not believe there is a dentist in New York who will not alter his case in order to get his money.

Dr. Hawes (Geo. E.) presented an impression for inspection which had been taken from the mouth of a person who had worn artificial teeth: this he denominated "an office fact;" he said, I have lived longer in the active practice of dentistry than many of you, and have filled more teeth doubtless than I can ever do again, and after a practice of twenty-five years may say that I am ashamed of my best efforts.

Dr. Latimer said, would like to know if it is possible to finish plates as quickly as we hear tell of—in two minutes after being removed from the plaster. I have the usual facilities, and use collodion on my casts, and the same scrapers that everybody else uses, but I cannot get a plate fit to go into the mouth in less than two hours, do the best I can! Cannot trim down with the file in less than twenty minutes. Have seen a gold plate, made in Nashville, Tennessee, by a jeweler, and it was certainly a rebuke to dentists. Nine in ten of the plates which I have seen will not begin to come up to it! If a jeweler can do this, we may! Especially when we charge so much for the rubber, are we excusable in giving a rough plate? I have seen plates so miserably finished that they were simply botches. Our patients can appreciate the finish; this is a point which they can understand. And the fault with many cases is not so much in the material as in the way in which it is got up and finished.

Dr. Jarvis said that when a patient came to him to get a set of teeth made, he always examines the mouth, and advises the party what he considers the best course to pursue, and if the patient will agree to have the work done as he directs, (he having first found the mouth to be a satisfactory one,) says that he will be responsible for the success of the piece.

The doctor continued, I like wax for taking impressions for partial cases, but prefer gutta-percha for exact impressions. Will agree to take an impression with gutta-percha, and test its correctness with one taken in any other substance you please. To prepare the gutta-percha for taking an impression, you must first get it up to 212° of heat, and then reduce it to about 100° before introducing it into the mouth. Generally rub a little soap-stone into the cast. To pack rubber I have a piece of oil-silk to lay between the rubber and the face of the cast; when the case is full enough, I lay on a sheet of gold foil after removing the oil-silk, and the foil vulcanizes fast to the rubber, making a nice clean back to the plate. To keep the joints clean, (the joints of sections,) have them beveled out a little, and put into them a strip of cotton twisted into a thread.

Dr. John Allen said, it would take a great deal of time to do this subject full justice. Three or four years before Christ, teeth had been made. There is no record of a time when artificial dentures were not made. It is well known that my post has led me in one direction. A majority of our profession do not seem to understand it, but I believe that the system which I pursue is the most perfect that man can make! It has been stated that the plaster expands so much, that it will not let the plate come down upon it! Now, I never made a piece of vulcanite in my life. It is claimed that you get a more perfect fit from it than when a plate is struck up from a metallic die. The metal, as commonly used, does contract, and consequently the plate will not go up into the roof of the mouth; the plate is too small because the die is too small; but this may be prevented. It is not unfrequently the case that a wrong articulation will prevent the fit, and it is a very necessary point to get a perfect articulation. It takes but little to trip a *perfect* plate; how necessary it is then to articulate the teeth so as not to be allowed to trip! Watch that point! A large number overlook one more point. When a mechanic undertakes to build, he will put his superstructure directly above his foundation; in arranging your teeth, be careful to keep that point in view, and set them so as to bear perpendicularly upon the ridge. When I get my teeth ready to go into the mouth, I say to the patient, "Now I must give you a lesson on eating. You must apply the tongue to the opposite corner of the plate from that where you bite, to counteract the leverage." I direct the patient to learn to move the tongue about cautiously, not to *whollop* it about as he did before having artificial teeth. The under teeth are more troublesome to learn to eat upon than the upper ones; nothing but time and practice can make them work.

Dr. Castle, in reply to the former part of Dr. J. Allen's remarks, said that Dr. J. Allen had once made a set of teeth for one of his patients, by his order, and as Dr. Allen said the plan pursued was right, the teeth were made right, the impression and dies were right; but when the work

was all done it was *not* right, as the gentleman could not use the case at all.

Dr. Burras said, if mechanical dentistry has no better advocates than it has had here to night, what has caused the progress in this department? During the beginning of my career, we were mere hewers of wood and drawers of water, in comparison with what we are at present. What has been the cause of the rise in our profession? We recollect when we used the real sea-horse tooth for artificial dentures. What gave so much reputation to the older dentists but their mechanical ability? What has established the dental depots? Was it operative dentistry? Was it not the desire to supply the mechanical dentist? Speaking of impressions, (that being the basis of all correct operations,) there is nothing like plaster for complete dentures. One man will be more expert in one kind of manipulation than another; but I employ for full cases, plaster, and for partial cases, wax. In the articulation there is one of the greatest difficulties; after the plate is raised, put on it a rim of wax and see if you have the thing correctly before proceeding further with the work. Place the plate in the mouth, tell the patient to swallow, and that instant clap your hand under the chin, and, holding the mouth just there, arrange your marks to work to. After arranging a set of teeth for a patient, make a register of the thing in plaster; then, if there are any complaints, you always have your register to refer to.

April 29th, 1864.

Subject for the evening—SIX-YEAR MOLARS.

Dr. Atkinson said that in the treatment of these teeth, there is considerable difficulty sometimes experienced from disturbances arising from conducting thermal and electrical currents. After preparing the cavities for the plug, he uses some non-conducting substance between the pulp and the plug, similar to Hill's stopping, then fills up with gold. Thinks the best art lies in the direction of *saving* these teeth, and not in their extraction. He whose highest ambition is to get money, will never be very successful with these teeth. Our profession is for the good of those whom we serve, and for the glory of God; and no one should be permitted to enter our ranks but such as are willing to put forth their powers in the saving of six-year molars. So many dread to encounter these teeth, that they have come to be almost universally sacrificed; but the time has come when we must work faithfully or be driven in disgrace from the field. In the treatment of these teeth, we should first have the heart so imbued with high purposes that nothing short of success will satisfy us. Success is attainable by no means short of knowledge! We should save these teeth especially, because the six-year molar has become the opprobrium of the dental profession, and nothing short of *knowledge* will do it.

Dr. Abbott read a paper on the six-year molar, and said that these teeth should *never* be extracted! They should be treated and carefully filled. He was entirely opposed to the practice of extracting these teeth with the idea of making room for their neighbors, believing that teeth should stand together for mutual support; and if the jaw was not sufficiently enlarged to admit of these teeth taking their proper positions, it should be spread to make sufficient room.

Dr. Atkinson indorsed Dr. Abbott's opinion, that the six-year molar should never be extracted; but explained that the word never in that connection does not mean to *always retain them*, but simply to always save them when best and possible.

Dr. John Allen should be guided by the necessities of the case, and when the teeth had been allowed to go so far as to make it necessary, should extract even the six-year molar.

Dr. Fitch said, if the dentist's work has reached that point where he *can* save teeth, he *will* save them; if not, he will not attempt it. The six-year molar I do not take out, even if the nerve is exposed, or if the tooth is half gone, or even if only the *roots* remain; I build up with gold and save them. When the roots are so far decayed as to be a source of trouble, it may sometimes be better to take them out; but I *never, absolutely never*, take out a *tooth*! If a man has the *ability* to doctor a thing of this kind, he will generally do it. If he sees that others do it, he will try to do it too. If you can save these teeth till the patient reaches the age of twenty years, you will be pretty sure to save them for a number of years thereafter.

April 30th, 1864.

Subject—FACIAL NEURALGIA.

After the reading of a paper on the subject by Dr. Castle, the regularly appointed essayist for the evening, Dr. Wm. H. Atkinson followed with the reading of a paper on the subject, giving it as his opinion, that neuralgic affections are not, as commonly stated, produced by occult causes, but are capable of being followed up to their source and cured. The doctor continued, in moist climates and in moist weather, neuralgia is most apt to be induced. This, therefore, shows the necessity for wearing next the skin articles of clothing which are non-conductors, as the best means of avoiding the disease. Over-feeding on rich food is another prolific source of the disease. I attribute the disease to a disturbance of the currents of the nerve-force.

In reply to a question, Dr. A. said the liquor-sanguinis and the nerve-blood are both colorless fluids; but the latter circulates only in the interior of the nerves. Nerve-blood cannot be seen or chemically defined. By collecting together a sufficient quantity of nerves and

squeezing them, we might obtain a sufficient amount of nerve-blood to have it chemically analyzed. Liquor-sanguinis is the lymph of the blood. The reproduction process is a process of solution; the pregnant state is, therefore, pregnant with neuralgia. There can be no neuralgia without the tendency to get back to the state of solution, the state of molecules.

Dr. Fitch said, when we understand the basal principles, we shall likewise understand the treatment of the subject.

Dr. Taft, of Cincinnati, being present, was called upon to address the Association, and responded by saying, on the subject of the evening I am only a beginner, and can therefore say nothing about neuralgia; don't know anything about it! but will say that I am exceedingly pleased with what I have seen here to-night; am necessarily *roused up* by it! Have seen more than I expected. There seems to be an animation here which is more than I *could* have expected! We may be encouraged to go on when we see what has been done, how rapidly and efficiently it has been done. There seems to be a warming up to the work hitherto unknown; there seems to be more life in the dental profession at present than in the medical profession; perhaps they have gone through with that same stage, and this may be merely incidental to our transition state.

The doctor made some more remarks to the same effect, comparing the past with the present and future of the profession, after which the meeting adjourned.

NEW YORK SOCIETY OF DENTAL SURGEONS.

BY DR. W. C. HORNE.

December 7th, 1864

Subject—FILLING TEETH.

Dr. Jarvis considered the filling of teeth to be a complex and difficult matter. In a paper recently read before the Society he had spoken of the manner of using gold; he would now offer a few suggestions in relation to amalgam. He had found Townsend's to be the best, but of late either the formula had been changed or less care was bestowed on its preparation than formerly. There were certain conditions to be observed in its use. It should be well triturated in a mortar, and *not* rubbed in the palm of the hand; also it should not be washed, even in alcohol, as the moisture materially interferes with the crystallization; the surplus mercury should be pressed out through buckskin. It should be packed and thoroughly condensed from the very commencement of the filling, and burnished lightly a number of times while crystallizing, and after several hours, or even days, it should be well finished by polishing and burnishing. Then the patient should be especially charged to keep the filling perfectly clean. He should confine its use to crown cavities, and such as are attended by like circumstances, where the face of the filling *can* and *will* be

kept absolutely clean by the friction of mastication or otherwise. There should be no overhanging edges, which would be sure to break or wear away, thus forming receptacles for destructive matter. This one feature is the cause of a large proportion of the failures of amalgam fillings. Again, these fillings should be used only in small or medium sized cavities, for the reason that the expansion of the metal in crystallizing is so great as to bring it away from the walls of the tooth at certain points, and also to project it from the orifice of the cavity. Large cavities may be more safely treated by first filling with the oxy-chloride of zinc, and then adding amalgam. Wood's metal might come into use very nicely here. A case of ptyalism has never been traced to the use of amalgam as its cause; and to suppose it would result from the oxidation of *good* amalgam fillings would be absurd. Yet when we consider the manner in which amalgam is sometimes used we are astonished that ptyalism and even death is not often the result. He preferred gold in nine out of ten cases, and yet when the proper conditions were fulfilled, cement had given him and his patients satisfaction.

Probably nothing but gold should ever be used for filling approximal cavities in bicuspid; and experience had taught him to cut away the crowns freely, so that they may never come together again, and that the food might press upon the gum and annoy the patient, necessitating its removal, and securing the cleanliness of the parts. The free use of the tooth-pick might obviate the necessity for removing so much of the tooth, but he had learned not to trust the patient nor to incur the risk.

Gold should never be put in the bottom of a cavity when it is very near the pulp; its vitality has often been destroyed by so doing. If the cavity is large enough to admit of a sufficient quantity, the oxy-chloride of zinc is the best material. It is well to saturate with the tincture of iodine; if creosote is used, it should be in the smallest possible quantity, and *not* with the view of saturating the tubuli, unless there be a lamina of semi-decayed dentine left in the bottom of the cavity. Creosote should never be used where it can reach the pulp, as it corrugates and devitalizes the soft tissues as far as it penetrates. Dilute alcohol is excellent for washing out cavities before plugging. If he were to use the mallet only in beginning or finishing a plug, it would be in the beginning, in order to lay a sure foundation and secure the solidity of the retaining part.

The most important department of this subject is the preparatory treatment, and yet it is the most neglected in practice and in discussion. If the general health is good, the fluids of the mouth properly balanced, the gums and teeth hard, clean, and healthy, the operation may be proceeded with at once; but if the opposite conditions exist, it would be unsafe and injudicious to fill the teeth until a decided change is effected. To accomplish this it is necessary to adopt some systemic or local treatment. The first may consist in given cases in mere *change* of diet or habits, or in the

use of some mild medicines, according to the indications. The dentist will have sufficient influence with his patient to accomplish all this; but if complicated artificial and expensive treatment be adopted it will generally prove a failure. Local treatment, on the part of the patient, should consist in the use of a brush once a day, and that just before retiring. Once a day only, for the reason that too much brushing wears and irritates the teeth and gums. The mouth during the day is like a running brook, the fluids are constantly changing, and the food, lips, and tongue are continually exerting a friction upon the teeth, and thus tending to keep them clean; but at night, while asleep, the mouth is like a stagnant pool, with the temperature about 90°. If the dishes have been washed after supper, there can be no good reason for washing them again before breakfast, unless the patient sleeps with the mouth open and the mice have been running over them. The toothpick should always be used after eating, to remove the remains of food. A good dentifrice is indispensable, and should be composed principally of the best preparations of chalk, magnesia, roots, and barks, and Castile soap; avoiding charcoal, cigar, or any other ashes, snuff and "fragrant sozodont" for potent reasons. Astringent and cleansing lotions are also often speedy and effectual in restoring the health of the gums and teeth preparatory to filling. And where preparatory treatment is needed, the cavities should be more or less excavated, the walls freely trimmed off, especially in approximal decay, and some temporary filling put in. Tin foil, or cotton saturated with a solution of gum mastic, is good for this purpose; but an invaluable article for the purpose is the ordinary white filling or oxy-chloride of zinc. This effectually closes the tubes, hardens the walls of the tooth, and excludes moisture, air, and changes of temperature. In this mode of operating, the results had far exceeded his expectations, so that it had become a regular practice with him.

Dr. Atkinson said the highest style of dental art is the restoring of the contour of the teeth, not merely saving them from destruction. If we had a special case for demonstration we should probably not be at variance. The man who is best acquainted with principles would probably be oftenest successful in practice. Gold is without doubt often injurious in close proximity to the dental pulp. He had numerous cases on record where pulps have bled and cotton and creosote had been applied, in one case for five hours, and then capped with gold, where secondary dentine had been formed; which sets aside the principle that creosote is inimical to the pulp, the instances against its use being outnumbered, within his knowledge, by the cases of subsequent formation of secondary dentine.

Dr. Castle had filled teeth, not sensitive, which afterward became so, and *vice versa*. His experience in filling over exposed nerves was that periostitis or alveolar abscess always ensued; and he therefore always removed the nerve when it was exposed. He had found that however well

teeth were filled they would break down around the margins of the plugs in very many instances; and the great question that underlaid all this discussion was, How to control the constitutional treatment so as to overcome the causes which produce disintegration? The dentist has to labor under a host of disadvantages, and there are many cases which defy the utmost skill to produce satisfactory results.

Dr. Fitch said, of course there were modifying circumstances in each case. If sensitiveness in the tooth substance arises from a peculiar diathesis, it will after a time pass away, but if from nerve exposure, it will not. In some patients exposed nerves may be preserved, depending on age and temperature. Tolerance may be established even in nervous structure, if the substance used is not an irritant; the oxy-chloride of zinc is a very violent irritant. If he had a case where the tooth bled at the tap of the mallet, he would not fill without treatment, if possible. In relation to leaving a V-shaped space between teeth, he had tried it and disliked it; in this way a large part of the crown of the tooth was lost, and much inconvenience caused to the patient, while, by restoring the contour of the tooth, the patient has the full use of the masticatory surface. He used the mallet in filling approximal cavities, and took plenty of time in filling, and found operations took twice as long by hand pressure as by the mallet. We do not come in contact with the acids of the stomach in the mouths of healthy people, but with dyspeptics it is otherwise; the acids of the mouth are what we have to do with, and these are generally alkaline, though in a diseased condition they are acid. He liked Dr. Barnum's rubber dam, referred to by Dr. Clowes, wherever he could use it, but that was only in some cases; but the wedge never fails. His was made of orange wood, and he invariably used it in filling approximal cavities; he wedges enough to keep the tooth steady, mainly to stop the secretions, partially to separate the teeth; if the wedge is in the way, he removes as much as is necessary.

Dr. Clark remarked that while some gentlemen preserved a space between the teeth, others wedged apart and after filling allowed them to come together again. In his early practice he had wedged a good deal, but found those wedged did not last as long as others; his experience had taught him to get rid of as much diseased bone as possible, and keep the teeth apart: the borders of fillings in approximal cavities should never touch; if they do, the decay proceeds. In answer to a question, the doctor said some teeth would decay if they were kept clean.

Dr. Clowes expressed his surprise that one of our old dentists should be inclined to doubt whether plugging a tooth is a permanent thing. He had been telling his patients for years that if there is anything certain it is that a tooth well filled will be preserved. Decay always results from the action of an acid; the dentist must trace out the decay to its utmost limits, and having removed it and perfectly filled the cavity, that tooth is

safer than it ever was; it came into the mouth imperfect, with flaws in it, but the gold plug is indestructible; it is the best part of a tooth, of all mortal things the most positive in its influence for good. He considered the wedge a good thing, and was not inclined to say much against it; but there was one little thing he would bring to notice again, the appliance of sheet rubber round the tooth; probably some present had got a sheet of the rubber at home and thought it a humbug—it is a glorious thing. No matter how the patient slobbers or flounders, it keeps every thing as dry as a tinder-box; it removes all anxiety about moisture, leaving the operator to pursue his work with perfect ease and confidence.

Dr. Atkinson laid down his rule for wedging—for soft teeth, use soft wood; for intermediate teeth, use a firm wood; for hard, stiff teeth, use hard wood. He instanced a case where the front teeth were loose, and one required filling—a lateral incisor. Wedges of soft wood were slipped in between the teeth with the fingers, so as to keep all of them erect in their sockets; all were then rapped in until they were firm; then they could be filled without trouble by hand or mallet. For hard teeth drive home till the mallet rebounds, then in a minute or two repeat the blow; a tension is thus obtained at the apex of the root, and the tooth is partially anæsthetized.

Dr. Perine had been in hopes that he had misunderstood the ideas of the supporters of wedges, but he was sorry to find he had not. He held that each member should be careful in recommending his extreme practice; patients are not made of iron, and do not like it; and he doubted whether gentlemen would be quite so heroic in driving home their wedges if they were aware that by so doing they drove away some very good patients. He disliked the practice, and had repeatedly seen evil effects produced by it.

Dr. A. C. Hawes acknowledged that the wedge was the biggest thing out. He uses a number of wedges, beginning at the crown, and so avoids injury to the gum. Loose teeth, if there is time, he surrounds with plaster, which, when it sets, retains them perfectly in position.

BROOKLYN DENTAL ASSOCIATION.

BY DR. W. C. HORNE.

December 14th, 1864.

Subject—PROTECTION AGAINST SALIVA IN FILLING TEETH.

Dr. Barnum, the essayist for the evening, said the subject to be ventilated was a very moist one, and in dealing with it all must acknowledge having at times been badly swamped. He found saliva the greatest trouble in every-day professional practice; and in his efforts to overcome it

he believed he had attained what had been a great desideratum. This is the application of pure thin sheet rubber around a tooth while under the operation of plugging, to prevent the salivary secretions from coming in contact with the work. To facilitate explanation, suppose the cavity to be filled is in the grinding surface of an inferior molar. The secretions being copious, in the ordinary way of keeping the parts dry (the cavity being large) there would be some three or four napkins used, which would be completely saturated ere the work was completed; besides, the mind of the operator would be possessed with the constant fear of a sudden inundation. Take a piece of the rubber from four to five inches square and cut a small hole, in size about one-tenth the diameter of the tooth; an operator will learn after a few trials at what point in the rubber the hole should be cut, as its position must be suited to the location of the tooth. Carefully stretch the rubber, so that the hole will be large enough to pass over the tooth, previously removing all deposits of tartar or other foreign substance that may be on or around its neck. This is very important, as its presence would prevent the rubber from hugging closely to the tooth, and so allow leakage. The tension upon the edges of the rubber surrounding the tooth produces a flange; if the edge of this flange should remain turned toward the grinding surface, the rubber would probably slip off; but with a blunt-pointed instrument carefully turn that edge toward the neck and work it under the free edges of the gum; there, from the natural shape of the tooth, converging toward the roots, it will remain quite firm. The rubber should not be so thin as to tear with slight force, or pull away from the surface of the tooth and allow the moisture to pass between. When the adjoining teeth approximate very closely it will be difficult to pass the rubber between them, but by pressing in a wedge near their necks a slight opening can be made for the passage of the rubber, after which the wedge is to be removed; this operation will sometimes be necessary on both sides of the tooth to be filled. Floss silk, well waxed, is very useful in such cases, as it can be made to force the rubber between the teeth, even though they touch each other. Having thus adjusted the rubber, dry its upper surface with bibulous paper, if necessary, and being careful to keep the flanges turned toward the neck of the tooth, proceed to operate without fear of moisture. With approximal cavities the application is a little different; for instance, take one between the bicuspid. Two holes are then cut in the rubber; so much apart that when put round both teeth the intervening strip will be broad enough to turn down and cover the margins of the gum between the teeth. If it is thought necessary to use the wedge in separating, it can be driven in above the rubber, care being taken to prevent its tearing the latter.

Dr. Latimer said he had tried Dr. Barnum's method, and had found it of great use. He expressed his gratitude to the discoverer for bringing it before the profession.

Dr. Mills had tried this plan and been troubled with the rubber slipping off the tooth; he had then tied it on, and proceeded in that way.

Dr. Barnum repeated that it was necessary the edges clasping the tooth should be turned toward its neck, and the rubber should be of the thickness of 32 wire gauge.

Dr. Clowes said he found Dr. B's. method very fine where a cavity ran up under the gum; it took away all anxiety from his mind during the operation.

Dr. W. H. Allen considered the saliva the trouble in operating, and he had used every means he had ever heard of to get rid of it. He had used the rubber as recommended by Dr. B. in a few cases, and it did well; he did not consider it essential that it should stand the test in every case to warrant approval; if it protected the tooth in one out of ten instances, it would be very valuable, and he believed it would exceed that proportion. He had used Dr. Hawes', Dr. Flagg's, and other compressory and tongue-holders, but generally got along without anything but napkins, and he arranged them so that the breath should not reach the plug. When the saliva accumulates rapidly in the mouth, he removed it with a syringe guarded with fine wires. If a plug got wet before it was finished, he burnished the surface and began anew.

Dr. Marvin described his method of arranging the mouth napkins, and said there were some mouths which he found it impossible to keep dry. He hailed the advent of the rubber as a very great improvement, and should give it a thorough trial.

Dr. Fitch had been much troubled within a few days by a very wet mouth; the saliva accumulated rapidly. The thought occurred to him, pump it out, and he did so with a syringe. He had since used it to his great relief in other cases.

Dr. W. H. Allen often used the syringe a dozen times a day; and by laying a piece of thin rubber between the folds of the napkin before rolling it up, the moisture was forced to travel round and round before the napkin could be wet through.

Dr. Atkinson rejoiced at such evidence as had been presented this evening that the days of submarine fillings had gone by. Many of the men who had held their heads high in the profession in years past, have committed themselves past recovery by asserting that they had filled under the saliva; while we have heard to-night, from the lips of an operator whose superior is not to be found, that he even prevents the moisture of the breath from reaching the tooth which he is filling. That the rubber should be useful in every case was not necessary to prove its value. The great point is to get everything like moisture away from the tooth. He had never used the rubber, but could see that the principle was correct; the hole should be cut so as not to tear, and if it could be made thicker round the edge it would be better. He believed that it would come to be the thing most generally used in common cases.

Dr. Francis began to use the rubber sheet last summer, and had met with good success; he had to-day filled an upper central incisor where the decay reached almost to the alveolar process, the mouth being a very wet one. He tried the rubber in this case; the edges round the tooth turned up: it was very satisfactory. He felt that much was due to Dr. Barnum from the profession; he considered his rubber dam an improvement of very great value to dentists.

Dr. G. E. Hawes referred to Dr. Arthur's compress pump as an excellent instrument for emptying the mouth of superabundant saliva; by touching it to one of the teeth all the fluid is drawn off without sucking in any of the membrane. He used napkins made of soft old linen.

Dr. Horne inquired what was the practice of different operators if a plug became wet before completion?

Dr. Mills said he rearranged his napkins, washed the surface of the plug with creosote, dried it with paper, and then commenced to add gold. He found it adhered very well.

Other gentlemen mentioned chloroform instead of creosote, which they used with good results.

Dr. Atkinson had had such fillings, of which he thought well at the time, come apart just at the place where the swamp angels got in; but anchoring into the gold or commencing over again from the beginning could not fail.

BUFFALO DENTAL ASSOCIATION.

THE monthly meeting was held December 5th, 1864, Dr. George E. Hayes, President, in the chair. The subject of the Dental Protective Union having been made a special order for this meeting, was taken up. After the reading of several documents relative to the Union, Dr. Whitney read a letter which he had received from the Corresponding Secretary of that body, and spoke at length, describing the objects aimed at by it. After some discussion, the following resolution was offered by Dr. Giffing, and was unanimously adopted:—

Resolved, That this Association recommends to its members to become members of the Dental Protective Union. Those desirous of doing so are requested to leave their names with the Secretary to be forwarded.

The regular subject for the evening, "The effect of diseased teeth upon the general health," was then taken up.

Dr. R. G. Snow enumerated quite a number of diseases, which had been shown to have their origin at times in the irritation caused by diseased teeth, and remarked upon the neglect of physicians generally to pay sufficient attention or attach proper importance to the diseases of the teeth.

Dr. Giffing described a case which had every appearance of pulmonary disease, which was cured by the extraction of the teeth.

Dr. Whitney said, he considered the subject by far the most important which had yet been brought up for discussion, and expressed his regret that not only physicians, but the greater portion of dentists did not take more pains to inform themselves upon it. He then contrasted dentistry, viewed as a profession and as a mechanical art, saying that upon the study of this subject hinges all the difference between the true doctor of dental surgery and the mechanical dentist. He then described the origin and distribution of the fifth pair of nerves, drawing attention to their intimate connection with other nervous trunks. As an instance of the effects produced by such connections, he described a case of paralysis of the right arm, induced by dental irritation. He also described a case of amaurosis arising from the same cause.

Dr. Oliver described two cases of apparent pulmonary disease caused by decayed teeth.

Dr. Southwick remarked that he had seen a similar case.

A committee, consisting of Drs. Oliver, Brown, and Whitcomb, were appointed to select a subject and essayist for the next meeting. They subsequently reported "Mechanical Dentistry" as the subject, and Dr. George. E. Hayes as essayist.

The meeting then adjourned.

IOWA STATE DENTAL SOCIETY.

THE Iowa State Dental Society met at Des Moines, the capital, on Wednesday, January 4th, 1865.

The following gentlemen were elected officers for the ensuing year: L. C. Ingersoll, of Keokuk, President; A. Rawson, of Des Moines, Vice-President; W. O. Kulp, of Muscatine, Corresponding Secretary; H. S. Chase, of Independence, Recording Secretary.

Essays on the following subjects were read, followed by interesting discussion: "Dental Therapeutics," by Dr. Chase; "On the Use of the File," by Dr. Trowbridge; "Pain in Dental Surgery," by Dr. Robinson; "The Extraction of Teeth," by Dr. Coulson.

The following resolution was unanimously adopted:—

Resolved, That the time has arrived when no person should enter the dental profession without having first *graduated* at a dental college; and we pledge the profession and each other that we will admit no one to a dental pupilage under us without a guarantee that he will avail himself of the high and necessary privileges of these noble institutions.

Voted to meet at the City of Dubuque, on the third Tuesday of July, 1865, at 7 o'clock P.M.

HENRY S. CHASE, *Rec. Sec.*

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

CORRELATION AND CONSERVATION OF FORCES. By EDWARD L. YOUNG, M.D. New York: D. Appleton & Co., 1865.—About a year since attention was directed, in the review department of the *DENTAL COSMOS*, to the highly interesting and instructive work on "Heat as a Mode of Motion," by Prof. Tyndale. Having been informed by several professional friends that they were induced by that notice to procure the work, and had derived pleasure and benefit from the perusal of its pages, I feel the more prompted and encouraged to recommend the work of Dr. Young to them, as one having a decided and intimate bearing on the subject-matter of the previous book. Containing as it does, in a compact and convenient form, the views of Prof. Grove, Helmholtz, Mayer, Faraday, Liebig, and Carpenter on one of the most important discoveries of the present century, the Correlation and Conservation of Forces, it cannot but prove interesting and instructive to those who desire to understand the true philosophy of the action of force on matter, whether inorganic or organic.

The perusal of this work, although no reference is made in it to mesmerism, suggested to my mind that the true explanation of the undeniable phenomena frequently attendant upon the manipulations of a mesmeric operator, must be sought for in the conservation, correlation, or unity which exist between all forces; all of which indeed may be regarded as only modifications of one great force. Whether the explanation thus offered shall prove more satisfactory than those already advanced, remains to be determined.

The following extract from the introduction is presented with the view of affording a brief insight of the important subjects of which this truly valuable work treats:—

"Toward the close of the last century the human mind reached the great principle of the indestructibility of matter. What the intellectual activity of ages had failed to establish by all the resources of reasoning and philosophy, was accomplished by the invention of a mechanical implement—the balance of Lavoisier. When nature was tested in the chemist's scale-pan, it was first found that never an atom is created or destroyed; that though matter changes form with protean facility, traversing a thousand cycles of change, vanishing and reappearing incessantly, yet it never wears out or lapses into nothing. The present age will be memorable in the history of science for having demonstrated that the same great principle applies also to forces, and for the establishment of a new philosophy concerning their nature and relations. Heat, light, electricity, and magnetism are no longer regarded as substantive and independent existences—subtile fluids with peculiar properties, but simply as modes of motion in ordinary matter; forms of energy which are capable of

mutual conversion. Heat is a mode of energy manifested by certain effects. It may be transformed into electricity, which is another form of force producing different effects. Or the process may be reversed: the electricity disappearing and the heat reappearing. Again, mechanical motion, which is a motion of masses, may be transformed into heat or electricity, which is held to be a motion of the atoms of matter; while, by reverse process, the motion of atoms, that is, heat or electricity, may be turned back again into mechanical motion. Thus, a portion of the heat generated in a locomotive is converted into the motion of the train, while, by the application of the brakes, the motion of the train is changed back again into the heat of friction.

"These mutations are rigidly subject to the laws of quantity. A given amount of one force produces a definite quantity of another; so that power or energy, like matter, can neither be created nor destroyed; though ever changing form, its total quantity in the universe remains constant and unalterable. Every manifestation of force must have come from a pre-existing equivalent force, and must give rise to a subsequent and equal amount of some other force. When, therefore, a force or effect appears, we are not at liberty to assume that it was self-originated, or came from nothing; when it disappears, we are forbidden to conclude that it is annihilated. We must search and find whence it came, and whither it has gone; that is, what produced it and what effect it has itself produced. These relations among the modes of energy are currently known by the phrases correlation and conservation of force.

"The present condition of the philosophy of force is perfectly paralleled by that of the philosophy of matter toward the close of the last century. So long as it was admitted that matter in its various changes may be created or destroyed, chemical progress was impossible. If, in his processes, a portion of the material disappeared, the chemist had a ready explanation—the matter was destroyed; his analysis was therefore worthless. But when he started with the axiom that matter is indestructible, all disappearance of material during his operations was chargeable to their imperfection. He was therefore compelled to improve them—to account in his result for every thousandth of a grain with which he commenced; and as a consequence of this inexorable condition, analytical chemistry advanced to a high perfection, and its consequences to the world are incalculable. Precisely so with the analysis of forces. So long as they are considered capable of being created and destroyed, the quest for them will be careless and the results valueless. But the moment they are determined to be indestructible, the investigator becomes bound to account for them; all problems of power are at once affected, and the science of dynamics enters upon a new era."

DENTAL REGISTER OF THE WEST—NOVEMBER.

"SPECIALTIES IN DENTISTRY. Read before the Cincinnati Dental Society. By DR. C. M. WRIGHT.—Dentistry, which is itself a specialty of medicine, is, in my opinion, capable of being divided into *at least* two departments—the operative and mechanical. This is no new opinion, nor is it a new subject. It has been talked of and written about for some time by members of the profession; but no decided movement has been made, I believe, in this neighborhood by intelligent dentists to create the specialties of operative and mechanical dentistry. To a certain extent in all offices in cities one of these branches has been cultivated at the expense

of the other, or rather, nearly every dentist is considered as either an operator or a mechanic. One has a mechanical business, another an operative, and again another has a large proportion of the diseases of the mouth to attend to. The same fact is noticed in mechanical men's practice. A certain kind of work, as continuous gum or vulcanite or gold plate, is demanded, in the office where this certain style of work is made *rather* a specialty. This may be taken as part proof that the tendency of an improving skill in, and an increasing knowledge of, dentistry, is toward a division of the practice, and that the time has arrived when our branch of the great healing art may be profitably subdivided into at least the operative and mechanical. The good old-fashioned country physician who carried in his saddle-bags and brains the means and the skill for attending to all the 'ills that flesh is heir to,' would no doubt have laughed at the idea of a class of practitioners who would take the eye or the ear or the lungs for their province, and devote their whole lives to the study and cure of so small a part of the human body. And there are now no doubt 'tooth doctors' who agree 'to perform *all* operations on the teeth in the latest and most approved styles,' and to warrant them at that, that would ridicule the man who could find enough in one department of dentistry to employ all his energies for its advancement. In the country, where many believe that filling 'rots the teeth,' and where others will 'gum it,' rather than afford the cost of a new-fangled notion, a set of artificial teeth, one pair of hands is expected to do all it can for the good of the patients it is fortunate enough to secure. In cities it is different, and it seems to me that it would be a long step toward the perfection of our profession if the two departments were made specialties. Then there are men who have decided talents and strong tastes for one or the other of these branches. One has a genius for filling teeth, for correcting irregularities, etc., etc.; the labor of grinding in artificial teeth, of carving in plaster, of working the metals, and of blowing his life away at the blow-pipe, is to him, to say the least, very dull work. He has no taste for it. He cannot enlist his soul in his labor. He dreads going into his laboratory; while his neighbor on the other hand trembles when he is called upon to take his hands out of the moulding sand to perform some delicate operation on the living organs of mastication. The mechanical operator's talents and tastes find ample scope within his boundaries. He studies the appearances and uses of the 'pearls' of the mouth, and the powers of expression of the 'human face divine,' and it is his highest ambition to imitate nature. He can become quite enthusiastic at his lathe, and the feeling and the name of 'common mechanic at his trade' belongs not to him. He is an artist, with nature for his model, and chemistry, anatomy, metallurgy, etc. for his instruments. If the operator could confine himself to his chair; if he could have this dread of the laboratory taken from his mind; if he could feel that from this time forth he was a physician and surgeon of the mouth and teeth, I believe his every operation would be better. He would advance his specialty and move onward, right onward in the direction of perfection. His fingers would be better trained for the exceedingly nice manipulation of his art. He would become more a master of his profession; and reputation, and money, and satisfaction would be his. The mechanical dentist too would have better opportunities, and be in a better condition to advance his specialty. By drawing a line between the two departments, both would be benefited, and improved; and dentistry as a profession would be advanced. A young man after completing his pri-

mary education, could then choose his department, and if he should devote all his energies to operative dentistry, or to mechanical dentistry, is it not very probable that in his life practice he would be a much more successful operator in his chosen sphere, and would not his specialty—his hobby—be brought to a higher state of cultivation, to a better pace, than though he were expected to perfect himself in all the various and different operations of the whole science and art of preserving, repairing, and replacing the teeth? We can not but think he would, and that if every man should choose his specialty, make one branch his study, devote himself to one department of dentistry, every man would be a better dentist. In this case he himself, the profession, and the patients too, would enjoy the advantages of this concentrated labor."

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BRITISH JOURNAL OF DENTAL SCIENCE—DECEMBER.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN. December 5th, 1864. EDWIN SAUNDERS, Esq., President, F.R.C.S., in the chair. At this meeting, DR. NORMAN W. KINGSLEY read a paper on the treatment of *Congenital Cleft Palate*, the substantial parts of which having already appeared in the DENTAL COSMOS, the discussion which ensued after the reading of the paper is only presented.

"Mr. SERCOMBE.—We have three or four points before us in treating these cases mechanically. The first is, whether, as mechanists, we can introduce an apparatus which shall not be put out of order, or, if put out of order, shall be repairable by the patient; whether that apparatus shall effect all we think it is possible any apparatus can effect; and whether it shall be durable. The apparatus, the effect of which I hoped to have exhibited to-night, meets these requirements, I think, more fully than the one now before the meeting. It is so simple in its construction, that the destructible part of it can be restored by the patient at will. It has never cost my patient the value of a brass farthing from the day it was put in to the present hour, and I do not think that it will cost him anything, unless his mouth gets very much out of shape. It is, therefore, durable. As to its effectiveness, I may merely state one fact, as my friend is not here to demonstrate that to you, and that is, that on Trinity Sunday last he was ordained by the Bishop of Norwich, who, I believe, is regarded as a very difficult bishop to please, and has been doing duty every Sunday since, taking charge of a large parish. Then as to the simplicity of the apparatus, I believe nineteen dentists out of twenty would be able to construct it without difficulty. The apparatus brought before us to-night, although it has the stamp of novelty about it, is not unlike an apparatus brought before the notice of the medical profession in the year 1845, if I remember rightly, by a Mr. Stearns. Certainly, in its main characteristics it resembles it. It differs, inasmuch as the material is different, and in some other minor points, but, in general principle, it very much resembles it. That apparatus was so difficult to construct, that although Mr. Stearns succeeded, as he says, completely, it has not been reproduced except in one or two instances, and, I am afraid, in those instances not with great success. Mr. Kingsley's apparatus is constructed of soft vulcanized India-rubber; as to its durability, he is silent. That rubber, so vulcanized, is destructible, I am afraid we all know, for a short time ago it was suggested to line hard vulcanized plates with soft rubber for the purpose of giving that plastic character to our work which Mr. Trueman has recently

brought before the notice of this Society, and, I believe, as far as I can make out, it has been abandoned again because it is so destructible in the mouth. This strikes me as a serious objection to Mr. Kingsley's apparatus, which is constructed entirely of this description of rubber, and which, from its complication, must evidently be reproduced by the original maker. The destructible part of my apparatus is, on the contrary, restorable by the wearer of it with the greatest ease.

"Again, Mr. Kingsley's apparatus is applicable only to one class of cases; mine claims for itself a wider berth. It is not only applicable to cases of congenital fissure, which are pretty much more or less alike, but it meets other cases; it meets those where the soft palate has been destroyed by some ulcerative disease. These cases are not very numerous, I grant, at least judging from my own experience, but I do see them, and I think a gentleman is here to-night who can speak of the success which has attended the employment of my apparatus in one such case, where my patient's speech was so completely destroyed by the destruction of the soft palate, the hard remaining perfectly intact, that he had for years excluded himself from all society; he could only make himself intelligible by pinching his nose with his finger and thumb while addressing you. He is now quite restored to his friends, and is at this moment enjoying the hospitality of a relation, forming one of a large party. In these cases, where not a particle of the natural velum remains movable, an apparatus which depends for its success upon being accurately fitted to movable parts is clearly of no avail. I do not wish to encroach further on your time; while admiring the ingenuity displayed by Mr. Kingsley in his apparatus, I have ventured to draw some little comparisons between it and the one I presented to the notice of this Society some years since; the one is complicated and requires a most ingenious mechanist, as the author himself states, to construct; the other is so simple that I believe any dentist could construct it. Supposing the results on the speech of the wearer to be pretty much the same, I think mine claims superiority on two points—simplicity of construction and durability; it has also the advantage of a wider application. I must apologize for having occupied so much time.

"Mr. ILLINGWORTH.—In a very few words I beg to refer to the case Mr. Sercombe has brought before you. This gentleman lost the whole of the soft palate from syphilitic ulceration. The tonsils also were absent, and there was nothing of a soft nature left. His articulation was so defective that those intimately acquainted with him had the greatest difficulty in understanding what he said. As Mr. Sercombe remarks, he used to hold his nose to enable him to speak at all. Within a much shorter period than Mr. Sercombe has stated, I could distinctly understand what he said, and he now speaks with so much freedom, and with so much ease, that a person who is not aware that he had had anything the matter would not detect it. But what has struck me equally in the case, has been the improvement in his general health. From the fact of so much air escaping through the nose, he always had a feeling of exhaustion, and since he has worn this instrument he has become, I may say, a stouter man, not a stout man, because he is a thin man still, but his general health has wonderfully improved.

"J. B. BELL.—I was under the impression that the author of the paper confined himself to congenital malformations. If so, it is to be regretted that cases, the result of disease, should have been introduced here to-night,

as they differ so entirely in their character. With regard to cases of disease, whether of the soft or hard palate, if these are to be alluded to, I have had occasion to make a great number of instruments for both, and it appears to me that almost as soon as you apply the apparatus the speech is restored. I had a woman who had lost the entire soft palate and part of the hard, and when it was replaced I saw her a few days afterward, and she spoke perfectly well; whether as well as she had done previously I cannot say. In congenital cases I have never met with a case that came at all to my satisfaction or anything near it. I have seen them years after and they have probably spoken better; but they have been very far from regaining their speech. As to whether the uvula is useful or not is a difficult point to determine, and one where we have very few opportunities of judging. I mean as regards congenital defect. I had a remarkable case a short time ago. It was that of a gentleman who had a peculiar sound in his voice. I looked into his mouth, and the uvula, as it were, was reflected back on to the soft palate, but there was no pendulous part of it at all. That man's speech was very thick indeed. That is the only congenital case I have ever seen; you can distinctly understand what he says, but his speech is very imperfect. I merely refer to that because it is a thing we scarcely ever come across.

“MR POLLOCK.—As one who has taken some little interest in the question of congenital cleft palate, I consider it my duty to rise to pay my tribute of respect and admiration to Dr. Kingsley for the very eminently practical and ingenious apparatus which he has brought before us this evening. I look upon it as one of a series of those very great improvements that have come from the other side of the Atlantic, which have conferred so much benefit on mankind. I cannot but feel, from the experience I have had in the treatment of congenital cleft palate, that the operation for closing it by surgical means is not always a satisfactory operation. There are a few cases which certainly offer every facility and every advantage for the operation, and in those few cases, we do succeed, in time, in procuring a considerable amelioration, if not almost perfection in articulation. I have in many cases observed a considerable improvement, I might almost say an immediate, improvement in the voice, and a subsequent and slow, but a very uncertain, improvement in the articulation. There is very often a large aperture between the mouth and the nares, which produces a most disagreeable cavernous *resonant sound* in the voice. That has been very much modified by operation in more than one instance, without, I may say, much material improvement in the articulation. So much with regard to the operation; but I am sure everybody in this room who has witnessed any number of congenital clefts will feel with me, that there are a class of cases in which a surgeon would not only be rash, but he would be very much to blame if he undertook an operation. I allude to those cases in which the soft palate is what you may call thin and deficient in quantity, in which the uvula is but a small point projecting on either side from a little curtain, which is drawn up on each side of the fauces. I have myself refused to operate in more than one such instance. I think such cases would have been materially adapted for Dr. Kingsley's apparatus, and I have taken advantage of my friend Mr. Sercombe's ability to improve these cases, and his apparatus has been eminently successful in its results. The circumstance of whether congenital cleft is inherited or not, I do not think is a matter of any importance for us to discuss here to-night, but as far as my own observations go, the larger

number of cases are certainly not inherited, there is no family taint as far as I have been able to ascertain. Two cases have occurred frequently in one family, but certainly I have not been able to trace hereditary transmission in but very rare instances. But there is one question which I should very much like to impress upon all who have anything to do with the treatment of congenital cleft palate, and if I never write another word, I hope that what I may have written upon that subject will produce some impression. I allude to the treatment of the infant who is born with cleft palate, and I wish to point out, with due submission to Mr. Sercombe—I wish rather to correct, if he will allow me, the impression that may have been conveyed by what he said, that the child dies because it cannot suck. It dies because it is deprived of its mother's milk. It is quite immaterial whether that milk is imbibed by the child by suction, or whether it is conveyed into the mouth of the child by a spoon; but as certain as the child is sufficiently nourished by care and caution on the part of the nurse with the mother's milk, I do not think it at all signifies whether the child has congenital cleft or not. The cause of death arises from the circumstance of the child not being able to suck the breast, and consequently the mother's milk soon disappears. But if occasion be taken to supply the child with mother's milk, I believe there will be a very material saving of life in these cases. The more formidable cases of congenital cleft palate die, because the children are starved; and this is a point which I think has been very much overlooked. We see children in the upper classes of life with congenital cleft palate living, because they are well nourished; we see those in the lower classes of life die, and die early, because they are not supplied with mother's milk; and as we all know the mother's milk is even essential without a cleft, so it is much more essential with an imperfect palate. There is no source of fatality greater in infantile life than hand-nursing, without the administration of the natural milk. There are one or two practical points in connection with the experience I have had in the early treatment of cleft; I think it is most desirable that the congenital cleft should be dealt with early in life, and as Mr. Sercombe would corroborate, my anxiety on that point has been met by him in one or two instances in which he has adapted his apparatus to children, with considerable benefit. In one instance in particular, I believe that the child's violence of temper was very much due to his inability to articulate and explain himself; and, I believe, from what I have heard since, that the child's disposition has been materially improved since the improvement in his speech. Of course it is for the profession, of which you are so distinguished a member, sir, to state whether in the growing palate the one or the other apparatus should be used, and perhaps it will be for Dr. Kingsley to explain whether, while the child's mouth is increasing in size and growing, it would be desirable to use this, which appears a more expensive apparatus than that which appears in my mind to be rather more adapted to it, namely, the apparatus that Mr. Sercombe has so successfully used. It is of very great importance that the child should learn to articulate early; and, I think, in all cases of congenital cleft palate, it is a great desideratum that an artificial palate should be used until the child arrives at years of discretion, to be able to decide whether an operation should be performed. There is one point I should like to mention with regard to the presence of the uvula, which Mr. Sercombe has found unnecessary to produce in the artificial palate; I have seen cases with simple cleft of the uvula, defective in voice; and I

have seen simple loss of the uvula produce defective voice. Whether it is that a certain escape takes place through the congenital cleft of the uvula, or whether it is that the contraction subsequent to ulceration produces general contraction of the velum I am not prepared to say; but of the fact there is no doubt, that with deficient uvula there is very often a defective voice. This apparatus of Dr. Kingsley's seems, as far as possible, I think, to meet the general requirements of the soft as well as the hard palate. It has the capability of adapting itself to the movements of the soft palate, either of stretching out the extreme that is required, or of contracting by folding over upon itself, and in this way I must say that I am rather inclined to give my verdict in favor of Dr. Kingsley's apparatus for the treatment of congenital cleft palate. With regard to the absence of the velum from ulceration, I have not the slightest doubt Mr. Sercombe's is eminently adapted and most successful. I think Mr. Sercombe, perhaps, has been rather modest in stating all that is his due in the treatment of these cases. I can most satisfactorily affirm that his treatment of the cases has been most successful. There was one case in which he not only made good the soft palate, but the treatment of the hard palate was the most successful and the most creditable piece of workmanship, scientific as well as mechanical, I think I ever witnessed. In that instance, the gentleman has not only resumed his work as a clergyman, but he has been able, I believe, to the present time, to continue it. The question which, I think, becomes a practical one with regard to Dr. Kingsley's apparatus is this: Can you manage to supply a large pauper population with anything like such an apparatus? I speak as a hospital surgeon, and one who, as you may imagine, has had a good deal to do with these cases, in consequence of having taken the subject up many years ago. I cannot but feel that this is an expensive apparatus to supply to hospital cases; but if it could be made an economical apparatus, I am quite satisfied that all who have to do with cleft palate as surgeons would be very ready to have recourse to it, rather than subject the patient to a painful operation, and an operation which is always doubtful as to its entire success. But there are cases after operation in which I may say a perfect restoration of voice has occurred; and I can confirm this statement by mentioning one case. It was an operation of closing the hard and soft palate, performed by the late Mr. Avery; in conversation with the boy upon whom it had been performed it was difficult to know that he had had any defect of voice. I do not think a stranger would have detected any defect more than if one of Dr. Kingsley's vela were used. I was much interested in one observation made by Dr. Kingsley as to the action of the compressor nasi muscle in congenital cleft, giving a power of acquiring a language foreign to our own, and yet at the same time not allowing the patient to master our own articulation perfectly; and I may instance one case: a boy upon whom the operation had been performed, did not recover his power of articulating the English language perfectly, but he subsequently learned German, and his German articulation was most perfect. That I think is a marked corroboration of Dr. Kingsley's statement; and I state the case upon the excellent authority of Mr. James Salter, Surgeon-Dentist of Guy's Hospital. As to the question with regard to the practical use of the apparatus for a large pauper population, I think it is one of very considerable importance. Then there is another question which I should like to be satisfied about, as far as Dr. Kingsley is concerned, and that is as to the durability of his apparatus. We all know that time renders

vulcanized India-rubber inelastic, and the substance then becomes friable; we know how careless individuals are, especially old women, as to the management of apparatus in their mouths. If this apparatus is used for any length of time or too long, the patient runs the danger of a portion breaking off on some occasion, and dropping down into the larynx, or else into the pharynx, which latter would not produce much inconvenience. There is that danger; and it has occurred to me since thinking over the subject before coming here this evening. This question is, I think, of so much importance, that we should be assured by Dr. Kingsley that the apparatus is durable, or if not durable, the necessity for its renewal should be pointed out to the patients who are induced to wear it.

(To be continued.)

LONDON DENTAL REVIEW—OCTOBER.

“ON FLAME; WITH A BRIEF ACCOUNT OF THE ACTION OF COMMON FLAME ON METALS AND METALLIC COMPOUNDS, THE THEORY OF THE BLOWPIPE FLAME, AND ITS APPLICATION TO METALLURGIC ANALYSIS. By ALFRED TRIBE, Lecturer on Metallurgy at the Metropolitan School of Dental Science, and Assistant to the Professor of Chemistry at St. Thomas's Hospital.—The use of flame in certain mechanical dental operations is so well understood that to dwell on this subject would be to professional men both tedious and fruitless, so we purpose at once to pass to the general consideration of flame.

“Transient flames, produced by natural causes, are often observable on marshy lands, the supposed cause of which is owing to the ignition of marsh-gas by phosphoretted hydrogen, both of which gases are eliminated during the decomposition of vegetable *debris* by the conjoint action of air and water. The vapor of zinc ethyl or methyl, as well as phosphoretted hydrogen, decomposes the moment either escapes into the air, and, as a consequence, generates sufficient heat to cause the non-gaseous elements of such a decomposition to vaporize, and with its gaseous elements to become incandescent, thus presenting at the orifice whence the escape occurs the phenomenon of flame. The cause of this spontaneous generation of heat, followed by flame, is due to the energy with which the constituents of these bodies combine with atmospheric oxygen.

“Metallic zinc, when raised to bright redness in contact with air, burns with a splendid bluish-white flame. Phosphorus, when raised to a temperature a little above its melting point, (42° C.,) inflames in contact with air, and burns, emitting a brilliant white light. Here, then, are examples illustrative of the heat of combustion being sufficient to cause a portion of the respective solid bodies to vaporize and to become incandescent—in fact, to produce flame—with bodies which at ordinary temperatures are solid.

“Finely divided metallic iron, prepared by passing hydrogen over its heated oxide, when brought into contact with air, combines with atmospheric oxygen with such avidity as to heat the metallic particles to whiteness; but, owing to the heat produced being insufficient to cause either the metal or its oxide to throw off incandescent particles, flame is not produced. In pure oxygen iron burns with far greater brilliancy than it does in atmospheric air. Still, it burns without flame, because the heat generated during its combustion, although sufficiently intense to liquefy and to heat the metal to whiteness, is not sufficient to cause it to assume the condition of an incandescent vapor. The same remarks are applicable to any pure variety of carbon.

"Kirchoff and Bunsen have shown that iron, copper, zinc, nickel, chromium, and a few other metals exist as incandescent vapors in the sun's atmosphere. These interesting facts were proved by comparing the bright bands of the spectra of the metals with the dark ones of the solar spectrum. In 1835, Professor Wheatstone discovered that the spectrum of the electric spark differs according to the nature of the electrodes. This discovery has been confirmed and extended by Bunsen und Kirchoff, who have produced from electrodes electric sparks which give a characteristic spectrum for the metal of which the electrodes are composed. Thus, these experimenters were able to obtain and compare the spectra of the metals with the solar spectrum, and, from certain coincidences, to infer the presence of a number of terrestrial metals in the solar atmosphere. The spectrum of a metal cannot be obtained unless the metal or a compound of the metal be vaporized, and the vaporized particles heated to incandescence. As the production of electric sparks are wholly independent of atmospheric composition, it may reasonably be inferred that they are intermittent flames, produced by the vaporization and incandescence of a minute portion of the metallic electrodes. Thus, it appears that the phenomenon of flame occurs whenever vapors or gases are sufficiently heated.

"In the above observations, it must have been noticed that one of the absolute requirements of flame is a high temperature: this is commonly supplied by the heat arising from chemical combination. Compounds have been mentioned which spontaneously inflame when passed into an atmosphere for which their constituents have a great affinity. The greater number of gases and vapors, however, do not thus spontaneously inflame, but require to be raised to such a temperature as will cause the combustible to enter into chemical union with the supporter of combustion. And this temperature differs for different bodies. Hydrogen may be mixed with oxygen, at ordinary temperatures, without combining; but if hydrogen, as it escapes through a small opening into the air, be heated to redness, it immediately unites with oxygen of the air, and burns with flame; whereas light carbonated hydrogen, the gas which constitutes 82.5 per cent. of coal-gas, requires the temperature of a white heat for its inflammation.

"The method generally employed to heat an escaping gas or vapor to the temperature necessary for its combustion is, to apply the heat obtained by the burning of some highly combustible material, to the point at which the escape takes place. Every one knows that after flame has been established—that is, after combustion has begun—the heat which gave it existence may be removed and the flame will continue to burn as long as the combustible and supporter of combustion are kept in the necessary proportion; the cause of which may be readily ascertained by glancing at the following temperatures of flames, as estimated by Bunsen.* It will be seen that the heat generated during their combustion is far greater than is necessary to inflame them:—

	Centigrade.
Sulphur flame.....	1820°
Bisulphide-carbon flame.....	2195°
Coal-gas flame.....	2350°
Carbonic oxide flame.....	3042°
Hydrogen flame in air.....	3259°
Oxy-hydrogen flame.....	8061°

* Phil. Mag., Aug. 1860, p. 92.

"The common form or shape of flame is due to the heat which is eliminated during its combustion, giving rise to ascending currents, by which the incandescent combustible is drawn to a point. The form of flame is to a certain extent modified by the shape of the orifice through which inflammable bodies pass immediately before ignition, as also by the state of the atmosphere in which they burn. Similar remarks apply to candle and oil flames. When the air is still, flame from a solid circular wick is conical. If otherwise, the form of flame is modified by the shape of the wick, or by the nature of the atmospheric disturbance in which it exists.

"The temperature to which gaseous or vaporous bodies attain during their combustion just enables them to appear luminous, but the heat necessary for this purpose is far greater than is required to heat solids to whiteness. A substance to produce a highly luminous flame must consequently either separate solid matter during its combustion or one of the products of its combustion must be solid. Candle and gas flames are highly luminous, because solid carbon separates during their combustion. The hydrogen flame emits but a feeble light, owing to watery vapor being the sole product of its burning. The temperature of the oxy-hydrogen flame is full five times as great as is necessary to heat a solid to whiteness, but still the illuminating power of this flame is very small, the reason of which must now be obvious. Finely divided solid matter introduced into either of the two last-mentioned flames causes them at once to become highly luminous. The production of Drummond's brilliant lime light beautifully proves the power which solid bodies have of absorbing heat and of emitting light, as well as of the great heating powers of the oxy-hydrogen flame. We find, then, that the luminosity of flame depends upon its containing solid incandescent particles, and that the color which such particles emit is due to the heat to which they are subjected.

"The following table by Pouillet shows the temperature necessary to produce the different colors which solids emit when variously heated:—

	Centigrade.
Dull red heat.....	700°
Cherry-red commencing.....	800°
Brighter	900°
Full red heat.....	1000°
Bright ignition.....	1200°
White heat.....	1400-3280°

"Flame is solid when its existence is independent of the atmosphere in which it burns. Electric flames (sparks) owe their solidity to their existence being independent of atmospheric air. A mixture composed of one measure of oxygen and two measures of hydrogen burns with a solid flame, because this mixture contains all that is required for the complete combustion of the respective gases.

"Flame, the existence of which depends upon atmospheric air, is hollow; consequently all common flames are hollow, because they cannot burn for a moment without the aid of atmospheric oxygen. The hollowness of the candle, oil, or gas flame may readily be proved by placing into the dark central portion of such flames a piece of wood or paper, when it will be observed that both of these substances will remain unignited."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"On the Vertebral Theory of the Skull. By G. M. HUMPHRY, M.D., F.R.S., Lecturer on Anatomy at the University of Cambridge.—[The following remarks formed part of one of Dr. Humphry's lectures on Anatomy recently delivered in the University of Cambridge.]

"In these lectures on the cranial bones I have several times spoken of the vertebræ of the skull and the vertebral theory of the skull. I ought, therefore, to tell you that this theory has recently been impugned in a course of lectures at the College of Surgeons by Professor Huxley; and as objections coming from one so justly esteemed as an anatomist and a man of science deserve our serious consideration, I must give you my reasons for persisting in the use of the expression, and for continuing to be a believer in the view which the expression conveys.

"By the 'vertebral theory of the skull' is meant the idea that the skull consists, fundamentally, of a series of parts or transverse segments, which resemble in their main features, or are homologous with, the components of the vertebral column, that is, with the vertebræ; in other words, we mean that the skull is essentially a continuation of segments similar to those of which the vertebral column is composed. We do not mean that the skull is a modified vertebral column, any more than we think that the neck is a modified back, or that the latter is a modified sacrum; but that, as the neck is evidently composed of pieces corresponding with those of the back, modified to suit their purpose, so the skull is composed of a series of pieces corresponding with those of the neck and the back, also modified or adapted to their peculiar position and relations.

"This idea, which perhaps first occurred to the philosophic and observant, as well as poetic, Goethe, which was formally propounded by Oken, and has been further laboriously worked out by Owen, commends itself in the main so thoroughly to myself, and seems to be borne out by so many considerations, that I was surprised to find it not only so decidedly questioned, as it has been by Professor Huxley, but to observe him coming to the conclusion that the vertebral hypothesis of the skull is altogether abolished.

"I will not now go into a detailed account of the sorting of the several cranial bones into their respective segments or vertebræ, various opinions being entertained as to the places which some of them should occupy: I am at the present time concerned only with the general principle that they, or at any rate the greater number of them, do admit of being distributed into segments, and that these segments correspond or are homologous with vertebræ.

"The general segmental distribution is admitted by Professor Huxley; and in the main composition of three at least of these segments, the hindmost three, he is agreed with most anatomists. The hindmost, or occipital segment, he says, consists of the basi-occipital, the ex-occipitals, and the supra-occipital—i.e. of what we usually call the occipital bone. The next, or post-sphenoid segment, consists of the basi-sphenoid, the ali-sphenoids, (commonly called the hinder part of the body and the great

alæ of the sphenoid,) and the parietals. The third, or pre-sphenoid segment, consists of the pre-sphenoid, the orbito-sphenoids, (commonly called the fore part of the body and the lesser alæ of the sphenoid,) and the frontals.

"Now this segmental disposition, which, as I have said, is admitted to the skull by Professor Huxley in common with most anatomists, is in itself a feature, and an important feature, of the vertebral system. In this general plan of its construction the skull clearly corresponds with that of the vertebral column, and it seems only a reasonable inference, in accordance with the uniformity of plan observable throughout the animal kingdom, that as these segments form a linear series continuous with those of the vertebral column, so they should be regarded as corresponding with them, and are properly indicated by the same name. But to admit this is to admit the vertebral hypothesis of the skull, that hypothesis which Professor Huxley considers to be abolished. What, then, are the other grounds for believing that these segments are of vertebral character?

"The first and most striking reason is their obvious general similarity to vertebræ. This seems first to have suggested the vertebral theory both to Goethe and Oken; and I think you can scarcely examine with any care a number of skulls of man and of the lower animals, in the fœtal or young state, before the bones have become ankylosed together, without having the conviction forced upon you that they are constructed upon the vertebral type. Take, for instance, these skulls of a young monkey, a young cat, and these sections of the skull of a human fœtus approaching the full period, and there seems scarcely room to question that the central parts of the occipital and sphenoid bones correspond with the bodies of vertebræ, and that the lateral parts of the occipital and the greater and lesser alæ of the sphenoid correspond with the vertebral arches. If they really do so correspond, that is quite sufficient to establish the vertebral hypothesis of the skull. We may suppose that the several appendages to these—the squamous portion of the occipital, the parietals, and the frontals, the hyoid, the portions of the temporal bone, the lower jaw, etc., correspond with certain other parts of the vertebræ; or they may be regarded as altogether supplementary—intercalated, as it is called,—to fulfill special purposes, and as having therefore no representatives in the vertebræ of the spinal column. The assigning to them a vertebral character is not necessary to our argument. It is sufficient for the vertebral hypothesis of the skull if we make out that its fundamental elements—its basilar portion and the chief parts contiguous to it—have their homologues in the spinal vertebræ.

"Not only do these bones resemble and form a continuous series with those of the spinal vertebræ, but their position with regard to adjacent structures is similar to that of the vertebræ. The alimentary tract is beneath them; the neural tract is above them, or inclosed by them; and the nervous cords from the latter, as well as its arteries and veins, pass through or between them. The arrangement of the veins between the neural envelope, or *dura mater*, and the periosteum, is the same in the skull and in the spinal column; and in this plate by Breschet the continuity and similarity of the venous plexuses upon the bodies of the spinal vertebræ with those at the base of the skull are clearly shown. The inferior petrosal, the cavernous, and the transverse sinuses of the skull are shown to correspond with and form continuations of the longitudinal and transverse sinuses upon the bodies of the vertebræ.

"I merely allude, however, to these points, and pass on to consider the developmental features; for it is upon these that Professor Huxley takes his stand; whereas I think it may be shown that from these, too, may be drawn very cogent arguments in favor of the view I am supporting.

"At a very early period the membrane of the yolk, where the future being is to be inclosed, becomes thickened, and forms three layers: an *outer*, from which the great neural tract and the skin are to be formed; an *inner*, from which the mucous membrane of the alimentary tract and its appendages are formed; and a *middle* layer, from which the vascular, muscular, and osseous systems are mainly to be formed. The outer layer presents a longitudinal groove, subsequently made into a canal, which enlarges or widens in front, where the brain is to be, and from the wall of which the spinal cord and brain are produced. Immediately beneath this groove—in the middle line, therefore, and in the middle layer, between the neural and the alimentary layers, and separating them at first in their whole length—appears a cylinder composed of cells, having some similarity to cartilage, and enveloped in a sheath. This is called the 'chorda dorsalis,' or 'notochord.' It is the first rudiment of the fore part of the spinal column—of the bodies of the vertebræ and the intervertebral substances; and it is important to remark that it is not confined to the region subsequently to be occupied by the spinal column, but it extends up into that which is to be the base of the skull, as far, at least, as the floor of the pituitary fossa, even if it cannot be traced, according to Reichert, to the very foremost part of the skull; and remnants of it may, in the embryo, be traced in the sphenoccipital uniting medium, which is the homologue of an intervertebral substance.

"On either side of the chorda dorsalis, in its whole length, is formed, in the middle embryonic layer, a blastematous substance called the 'protovertebral substance,' or 'protovertebral plates.' These grow together in the middle line, encroaching upon the chorda dorsalis, extending upon its upper and lower surfaces, and finally inclosing it altogether. From the part thus encircling the chorda dorsalis are developed the bodies of the vertebræ and the intervertebral substances, the only remnant of the chorda dorsalis in mammals being the central, more fluid part of the intervertebral substances. While they are growing inward and inclosing the chorda dorsalis, and forming the structure from which the fore part of the spinal column is to be developed, the protovertebral plates are also growing upward at the sides of the neural canal, and ultimately arch over and inclose that canal, forming the structure from which the vertebral arches are developed. Furthermore, from this protovertebral substance are formed the spinal nerves and muscles, and the muscular and osseous layer of the visceral wall.

"Now this 'protovertebral substance' extends with the chorda dorsalis into the cranial region, enclosing the chorda dorsalis so as to form the blastema for the central parts of the occipital and sphenoid bone, much in the same manner as it does for the bodies of the spinal vertebræ; while a process of it runs forward to form the middle plate of the ethmoid. At the same time, it rises up on either side of the neural mass to enclose it and form the blastema from which the sides and vault of the skull are developed; and its lateral parts bend downward to form the visceral or facial part of the skull.

"The protovertebral substance therefore extends along the whole length of the embryo, from the nasal to the caudal end; and encloses three ca-

nals: one small, containing the chorda dorsalis; a second, above this, larger, containing the spinal cord and brain; and a third, larger still, beneath the chorda dorsalis, containing the visceral structures.

"It will be perceived, therefore, that thus far the median and lateral parts of the occipital bone and the median and lateral parts of the sphenoid bones, to say nothing of the ethmoid, correspond in their mode of development with the bodies and arches of the spinal vertebræ as closely as they do in their construction, and in their position and relations to adjacent parts, or even more closely.

"What, then, are the features of difference that are considered sufficient to counterbalance these strong points of resemblance, and to abolish the vertebral hypothesis of the skull?

"They are, first, that in the spinal region the protovertebral substance is no sooner distinguishable than it exhibits transversal markings or cleavages, so as to form square-shaped portions, or segments, on either side of the chorda dorsalis. These segments are observed in the neck and the trunk, and they increase from before backward through the lumbar and caudal regions; but they have not been seen in the head. They are called 'protovertebræ.' They are rather conspicuous bodies, and their presence, at one period, in the spinal region, certainly does constitute a marked *apparent* difference between the development of the vertebræ and that of the skull. I say an *apparent* difference, because their relation to the development of the vertebræ is not so intimate as might be supposed from their first appearance and their name.

"Though called 'protovertebræ,' they are really the blastematosous substance from which the spinal nerves and ganglia and the spinal muscles are formed, as well as the vertebræ; and these structures engross the larger part of them. Indeed, the major part of each protovertebra goes to make the spinal nerve and ganglion of that segment. Moreover, these protovertebræ, as they are called, have been shown by Remak not in reality to correspond with the future vertebræ. That is to say, the segmentation of the permanent vertebræ does not correspond with that of the protovertebræ. Each permanent vertebra is not formed from a preceding protovertebra, and each intervertebral substance does not correspond with an interval between two protovertebræ; but each permanent vertebra is formed from parts of two protovertebræ, the fore part of one uniting with the hinder part of another; and each intervertebral substance corresponds with the middle of a protovertebra. It would seem therefore, really, that these 'protovertebræ' are segments or cleavages pertaining to the development of the nerves and their ganglia, rather than to that of the vertebræ. At any rate, I think, in the present state of our knowledge, to found any strong vertebral theory upon them, or to make their transitional condition so essential to the constitution of vertebræ as to render its absence a ground for denying the vertebral character of the skull, is, to say the least, decidedly premature.

"A second objection to the vertebral hypothesis of the skull is founded upon Rathke's observation that the disposition of the protovertebral substance, in front of the region of the occipital bone, differs from that which it has in the spine. Instead of investing the notochord, it sends forward two processes or trabeculæ, one on either side, which underlie the lateral parts of the skull. The body of the sphenoid, although arising in this mass, does not appear to be developed around the notochord, but in front of it, and the body of the pre-sphenoid is developed independ-

ently of it; and in front of this the trabeculæ coalesce, and the ethmoid is developed from this coalesced anterior portion. In some of these particulars, it should be observed, Rathke's descriptions differ from those of Reichert; but they are not a very important matter, and Rathke himself does not regard them as constituting an essential deviation from the vertebral mode of development. Indeed, as quoted by Professor Huxley, he conceives the ethmoid to be the anterior end of the vertebral column, and speaks of the four different groups of bones—the occipital, with its intercalary bone, the squama; the basi-sphenoid, with its intercalary bones, the parietals; the pre-sphenoid, with its intercalary bones, the frontals; and the ethmoid, together with its outgrowths, the spongy bones and the cribriform plate—as exhibiting, in their successive order from before backward, a greater and greater deviation from the plan according to which ordinary vertebræ are developed; so that the occipital bone is the most like the vertebra, while the ethmoid is the least.

"I need scarcely repeat that I am not advocating any particular vertebral theory of the skull. I am merely expressing the opinion which I hold in common with Rathke and others, that these deviations from the plan according to which ordinary vertebræ are developed are not of sufficient importance to induce us to abandon the view, forced upon us by so many other features of resemblance, that the skull is mainly developed upon the vertebral plan, and consists of a series of vertebræ. The deviations of the occipital from the other vertebræ are scarcely greater than those of the atlas. Indeed each vertebra has its peculiarities, and these peculiarities are due to deviations in development. All the vertebræ are formed upon the same general plan, but deviate from one another in their formation so as to meet their respective requirements. So that it is only a question of amount of deviation—a question, taking into account the differences that exist in the several parts of the spine, whether the cranial segments so far differ from those of the spine as to outweigh the numerous and striking points of similarity that I have mentioned. In confirmation of the view that they do not, I am glad to be able to adduce the opinion of the most recent as well as one of the fullest and ablest writers on embryology. Kölliker, in his 'Entwickelungs-geschichte des Menschen und der Höheren Thiere,' in which he collates and reduces the observations and opinions of all the more successful investigators of this branch of physiology, devotes a paragraph to the comparison of the skull with the vertebral column. He takes full account of the differences in the mode of development; and yet, chiefly upon developmental considerations, regards it as pretty certainly proved that the several parts of the primordial skull—the ethmoid as well as the pre-sphenoid, the post-sphenoid, and the occipital—belong to the vertebral column, and are to be considered as the modified anterior end of it.

"I think therefore that, instead of considering the vertebral theory of the skull to be abolished, I am still justified in directing your attention to it, and in asking you to regard the skull, by its segmental construction upon the vertebral type, as affording an example of that grafting of variety in detail upon uniformity of plan which pervades the skeleton, and which indeed is traceable throughout the works of nature."—(*Lancet*.)

Reunion of Nerves.—"The question whether, after an injury to a nerve, its two extremities may unite again by first intention, with simultaneous rapid recovery of function, has recently attracted the attention of

Continental physiologists and physicians in a marked manner. Not only have hecatombs of dogs and rabbits been sacrificed on the altar of science for the purpose of settling the question, but there have been several surgical cases of unusual interest under observation which have thrown considerable light upon the point at issue. One of these cases recently occurred at Paris, under the care of M. Nélaton, and was reported in the *Société de Chirurgie* by M. Honel. A patient was operated upon by Nélaton for a neuroma in the course of the median nerve, and a piece of the nerve, about an inch long, had to be excised. Both extremities of the nerve were then united by metallic sutures. As early as the following day, Nélaton observed some movements of the thumb and return of sensation in those parts of the skin animated by the median nerve. On the second day after operation these phenomena were quite distinct, and a week afterward both motion and sensation were so far re-established that there could be no longer any doubt about the nerve having been quite restored to its natural condition. Most of the members of the *Société de Chirurgie* declared this to be impossible. Messrs. Broca and Verneuil asserted that either the observation of the case had been faulty, or the diagnosis must have been wrong from the first. There was no case on record at all similar to the one just mentioned, and physiology, as well as observations at the bedside, plainly proved that regeneration of nerves was exceedingly slow, and protracted over months and even years.

"A few days after this discussion had taken place, M. Laugier related an analogous case which had just occurred in his wards in the *Hôtel Dieu*, at a meeting of the Academy of Sciences. The case was one of injury to the forearm, both the radial and ulnar arteries, the *palmaris longus et brevis* muscles, some bundles of the *flexor sublimis* and the median nerve being torn asunder in a transverse direction. When the patient was brought into the hospital, hæmorrhage was so considerable that the house-surgeon at once tied both arteries, and united the flaps of the skin by sutures. When M. Laugier saw the patient sensation was entirely gone in the whole extent of surface animated by the median nerve, viz., the palmar surface of the thumb, first and second fingers, and the radial side of the third finger; and partly gone in the skin animated by the radial nerve, viz., the index and the inferior part of the dorsal surface of the second finger; only two-thirds of the transverse diameter of the radial nerve having been torn asunder, opposition of the thumb was impossible. M. Laugier thereupon reopened the wound, and found the lower end of the median nerve free just above the annular ligament; the upper end was not visible, and for the purpose of finding it, he incised the flap to the length of about three inches, and after section of the *flexor sublimis* muscle, the upper end of the median nerve came to light. Laugier now united both ends of the nerve by a silk suture. The pain and fever after this operation were not more severe than they might have been after the original injury. On the evening of the same day sensibility appeared to a certain extent restored, but it was still very obtuse. The next day, however, it was much more distinct, although there was still some difference in the parts animated by the median and ulnar nerves respectively. Opposition of the thumb was easy. On the second and third days the patient was not yet able to feel pain or to distinguish heat from cold. On the fourth day the sensation of temperature had returned. M. Laugier was of opinion that the rapidity of recovery of nervous function in this

case, when compared with the experiments made on animals, was partly due to a different operative proceeding, and partly to the perfect immobility of his patient; and he drew the following conclusions from the case:—

"1. If after the section of a nerve, its two ends are united by suture, sensation and motion of the parts animated by the nerve may to a great extent be restored within a few hours.

"2. The recovery of function is altogether rapid.

"3. It is successive, that is, tactile sensation and motion return before the sensation of pain and temperature.

"4. The nerve-suture causes neither particular pain nor other symptoms of a severe nature.

"5. It therefore appears necessary to receive the suture of large nerves as a legitimate surgical operation.

"This first report was followed by a second, made thirty-six days after the operation, and which is to the following effect: On the twelfth day the ligature came away, and symptoms of severe neuritis set in, viz., lancinating pains in the thumb, first, and second finger. At the same time, there was numbness in these fingers, and considerable decrease of the sensibility previously regained. The symptoms of neuritis disappeared after five or six days, and there was then gradual recovery of sensibility, although at the time of the report this was still in a somewhat unsatisfactory condition. The academy has charged a committee, consisting of MM. Flourens, Andral, Velpeau, and Bernard, with the examination of the patient in question; and this is so much the more to be commended as the account M. Laugier has given is in several respects very loose, and his examination does not seem to have been made with that degree of caution which ought to be employed under such circumstances.

"The most recent physiological experiments on this subject have been undertaken by Drs. Eulenburg and Landois, of Greifswald, who operated on all kinds of nerves, viz., motor, sentient, vaso-motor, and inhibitory, in dogs and rabbits. The general results at which these gentlemen have arrived are as follows: If nerves are divided and afterward united by suture, there is no tendency to healing by first intention, even if the coaptation of the ends has been most careful and aided by immobility of the limb, etc. On the contrary, there are invariably signs of interrupted conduction at the locality of the suture and lost function of the peripheral end of the nerve; that is, we observe loss of motion and of electric contractility of the muscles if motor nerves have been divided and reunited. In the case of sentient nerves there is loss of sensation; in that of vaso-motor nerves there is increase of temperature, profound disturbance of nutrition, and even gangrene; and in inhibitory nerves, loss of inhibitory influence. All these symptoms remain unchanged within the next days and weeks. The microscopical examination shows the same results, there being within the first few days after the operation fatty degeneration of the peripheral end of the nerve, just as after section without subsequent union. On the other hand, the fibres of the central end remain comparatively unchanged. The cylinder axis takes part in the degeneration. It is true that, on adding collodium, it becomes visible at the peripheral end, but its width is very unequal, and occasionally it is quite interrupted; while such changes have never been observed in the central end. The operation of nerve-suture causes, in many cases, a more or less extensive neuritis and peri-neuritis, which may even give rise to suppuration

and metastatic abscesses in the lungs, and it is therefore by no means devoid of danger. It thus appears that M. Laugier's proposal of adopting nerve-suture as a legitimate operation ought to be rejected, an opinion in which most surgeons will probably coincide."—(*Berlin Correspondent of Med. Times and Gaz.*)

Anæsthetic Effects of Pure Sulphuric Ether.—"M. REGNAULD, who communicated to the Paris Academy of Medicine an account of the means of obtaining sulphuric ether in a state of complete chemical purity, questioned M. Gosselin upon the results of any trials he may have made with this pure ether. M. Gosselin replied that he had felt little disposed to abandon the use of chloroform in favor of ordinary sulphuric ether, which induces so much agitation during its administration as to render the production of anæsthesia by its agency difficult. M. Regnauld, however, having supplied him with some ether chemically pure,—that is, containing no alcohol,—after trying experiments with it on animals, he administered it to seventeen patients about to undergo operations. He found that the anæsthetic effects of this ether are far more rapidly produced than is the case with ordinary ether, while they are also more certain. There is no stage of agitation, and only from four to eight minutes are required to produce absolute insensibility. In these respects M. Gosselin considers that this chemically pure ether occupies the same rank as chloroform, and that it should therefore be preferred to that agent, as no fatal result has ever occurred from its employment even in its impure condition. (The surgeons of Lyons have long since renounced chloroform in favor of ether.)"—(*Med. Times and Gaz.*)

"The Utterior Physiological and Pathological Effects of Anæsthetics.—The discussion on this subject before the N. Y. Acad. of Med. was opened by Dr. Frank Hamilton, whose views were new and startling. He said, in substance, that he believed anæsthetics had produced ten times as many deaths as was generally believed, especially in the army; that they injured the blood; often producing alarming and dangerous prostration and vomiting; they rendered the muscular flaps in capital operations flabby and lifeless for 24 to 48 hours; and that it was rarely possible to get union by the first intention after their use. He cited Drs. Mott, Wood, and Post, as authority, that at an early period, before anæsthetics were used, union by the first intention was the almost invariable rule, after capital operations, throughout the city and in the New York Hospital. And in the army, where anæsthetics were used so freely, the surgeons almost universally testified that after amputations union without suppuration was impossible; and, finally, abundant proof could be adduced that the same results obtained, he believed from the same cause, in the army of the Crimea.

"These views were combated by several members. Dr. Detmold said, it was well known that in our armies a scorbutic diathesis had existed, which prevented good success in surgical operations. That this diathesis existed in the Crimean army was a matter of history. He argued, that at an early day, when the City of New York was comparatively small, and the N. Y. Hospital smaller and less crowded than of late years, better success, of course, was obtained in surgery—the reason was manifest. He believed the physiological effects of anæsthetics, though powerful for a short time, were temporary—soon leaving the patient in as favorable con-

dition as before their administration. Dr. Connant and others advanced similar views. Dr. Squibb said, he thought much of the injury from anæsthetics was the induction of asphyxia from too great exclusion of atmospheric air, as well as syncope from too long administration of the remedy. Notwithstanding the opposition excited by Dr. Hamilton's remarks, the logical manner in which he advanced his views, and the interesting facts which he had collected from his extensive observations in military and civil hospitals, secured to him the respectful attention of the Academy, and impressed many of the members with the soundness of his opinions on this subject."—(*N. Y. Correspondent of Chicago Med. Ex.*)

Surgical Diseases connected with the Teeth.—In the course of a review of "A System of Surgery, Theoretical and Practical, in Treatises by various Authors. Edited by T. HOLMES, M.A. Cantab., etc. Vol. iv. London: Longman & Co. 1864," the *Med. Times and Gaz.* gives the following notice of a new publication on this subject.

"The essay with which the volume opens is written by Mr. S. J. A. Salter, of Guy's Hospital. It is upon the 'Surgical Diseases connected with the Teeth,' and includes the subjects of alveolar abscess, painful and difficult eruption of the wisdom teeth, tumors of the gum and tooth pulp, abscess of the antrum, dentigerous cysts, alveolar and maxillary necrosis from phosphorus, hæmorrhage after extraction of teeth, and the application of obturators and false palates in cleft palate, etc. All these are subjects of great importance. The author dwells very fully upon the subject of impaction of the lower wisdom teeth from misdirection, and upon the very serious results which sometimes follow, especially when the crown takes a forward, and especially a forward and outward direction. When the impaction is severe and not likely to be remedied by time, and when evil results are imminent, it is clear that either the offending tooth must be extracted or the second molar must be removed; and although, as a general rule, the former step is to be preferred, yet when the second molar is carious or necrosed, or the wisdom tooth cannot be reached on account of the rigidity of the spasm of the masseter, the second molar should be extracted, even if sound. Mr. Salter thinks that when this has been done, and the wisdom tooth has consequently attained an improved position, so as to be habitually used in mastication, as the second molar normally is, it is less liable to caries. Another excellent section is that on abscess of the antrum. The author alludes to that remarkable condition of the cavity to which Mr. Cattlin directed attention three or four years ago, in which, by a septum of bone projecting from its wall, a complete pocket may be produced, within which an adventitious body, such as the fang of a tooth, may be concealed; which, although undiscoverable by the ordinary methods of exploration, may, nevertheless, be producing an immensity of mischief in the antrum. In speaking of hæmorrhage after the extraction of teeth, while recommending the lint-plug saturated with turpentine or tannin as the best local application, Mr. Salter very properly dwells upon the necessity of viewing these serious hæmorrhages as indications of constitutional vice, and of the importance of adopting a corresponding general treatment. We regret that any considerations arising out of the necessity for preliminary discussion of physical questions, and especially out of limitation of space, deprived the possessors of this volume of the benefit which would have resulted from a brief discussion of the principal topics connected with dentistry proper. It will

necessarily be that these volumes will take the place of a host of separate treatises in the case of emigrating surgeons and practitioners in remote localities, and we submit to Mr. Holmes that the subject is one of sufficient importance to these classes of readers to warrant the devotion of some pages to it in a future edition. The bulk of the volume would not be very greatly increased, while its usefulness would, for dentist-surgeons are not to be met with everywhere, while the need for the practice of the art of dentistry is tolerably universal. A village or colonial surgeon should be as capable of stopping a tooth as of extracting one successfully, and should be a judge of the condition under which the one operation or the other is to be preferred."

Removal and Replacement of Natural Teeth.—"At the annual meeting of the Odontological Society, held on the 9th of January, MR. HULME mentioned a case in which a lady had her three front teeth attached by tartar, and could be readily removed and replaced. The curious point was, that although remaining in that state about seven years, the presence of the teeth had preserved the gum from being absorbed."—(*Lancet*.)

"Healing Power in various Nations.—The great vital energy of savage, compared with civilized nations, is shown by the relatively greater healing power of nature (*vis medicatrix naturæ*) possessed by the former. The experiments made in this respect extend to all races. Leigh mentions the case of an Australian whose temporal bone had been fractured by a blow, and the temporal artery divided, and of another whose ulna and radius had been fractured in a terrible manner, that the first took part on the following day in some public meeting, and that, though worms appeared in the arms of the second, the recovery in both took place without any operation or even dressing. Similar cases are to be found in Barrington and Dawson. Though but one in four recover from the operations of extirpation of the penis and the testicles, which are performed on negroes by the slave-dealers in East Sudan, many examples prove that nature's healing power is as great here as among other negroes. This extends also to the white races living in Africa, although Russeger points out that in the hot climate of tropical Africa, wounds heal very slowly in the European, especially during the rainy period. Others, however, maintain that in the tropics, *e.g.* at Trinidad, wounds heal rapidly even in Europeans. W. Earl ascribes the natural healing power among the Malays to their vegetable diet, which prevents violent inflammation. Petit reports a series of his own observations in Abyssinia, that those who are punished by having hands or feet cut off, as well as the children or adults who are emasculated or have the whole genitals extirpated, do not generally die from the operation, although the wounds are entirely left to the healing power of nature. Parkyns relates similar instances. To the Moors, Chénier ascribes that great innate healing power and insensibility to pain, which has been so often attributed to the native Americans. Rengger is also of that opinion, while many modern observers ascribe to the native Americans a highly sensitive and nervous constitution. The case resembles that of the Bedouin Arabs, who consider it a point of honor to exhibit no sign of pain.

"With regard to the native Americans, a relatively greater healing power has been observed among the Blackfeet, the Indians of Paraguay,

and the Abiponions; and of native Mexicans we hear that they heal wounds which would be mortal to Europeans by merely washing them with brandy. Malays also frequently recover from injuries which would prove fatal to Europeans. Of twelve Tonga Islanders whose arms were cut off in the rudest manner, one only died from loss of blood, and another from grief. Similar instances of Marquesas Islanders are reported by Marchand.

"These examples prove that the healing power of nature is greater among savage than among civilized peoples. We must not, however, close these observations without mentioning another circumstance which has been made use of to establish the specific difference between the races of man, especially between the black and the white. It has been asserted that the lice of the negroes are not only black and smaller than in Europeans, but that they do not exist in the latter, while the European louse perishes in the tropics. Both these assertions seem to have been first made by Oviedo, which he qualifies by adding, that European vermin is rarely preserved, while that of the Indians only attacks some children of the whites born in America. As Peters proves to a certainty, that the European louse does not perish under the equator, there is no occasion to dwell further on this point. It is scarcely necessary to observe that the domestic swine, though not specifically different from the wild hog, has a parasite which is wanting in the latter; the color of these animals changes with the color of the skin, on which account Sömmering did not consider the *pediculus nigritarum* as of a different species from the European louse. It seems also certain that both the head louse and the *p. pubis* of negro nurses passes to white children. Quandt is at any rate incorrect when he asserts that the fleas and lice of Indians and Americans did not infest Europeans. Neither do the various species of intestinal worms exclusively infest one race, though one species may more or less predominate in any people. Thus in England, Holland, and Germany the *tænia solium* prevails; in Switzerland and in Russia, down to Königsberg, *bothrioccephalus latus*; in the southeast of France both prevail; in Abyssinia and among the Hottentots *tænia* predominates."—(Waitz's "Introduction to Anthropology," and *Boston Med. and Surg. Jour.*)

"On Mounting Microscopical Preparations in Canada Balsam and Chloroform. By WILLIAM HENRY HEYS, Esq.—It frequently happens that, after a microscope has been purchased and the few objects which were bought ready prepared have been examined again and again, the instrument begins to be neglected, and that simply because the observer is disheartened by the complicated nature of the instructions given by most writers who describe the method of mounting objects in Canada balsam upon the usual plan. Nothing probably keeps alive an interest in microscopic investigation more than the constant accumulation of objects of one's own preparation; and as many of the most beautiful, particularly that large class which comes under the term 'polariscope objects,' can best be exhibited when mounted in balsam, it will be obvious that every aid should be given toward simplifying the process as much as possible. My attention was first called to a method of mounting objects in Canada balsam and chloroform by Mr. John Hepworth, of Croft's Bank. I have found this plan so easy and pleasant that I am satisfied, were it generally known, there would be a greater number of students who would prepare their own objects than at present, thus accumulating a valuable cabinet of

microscopic slides at a very trifling expense. Having mounted a considerable number of specimens in this medium, I can give my testimony to its great superiority over the old plan, in which the use of hot plates and the application of heat to the slides were sources of endless trouble and frequent failure. My object in calling your attention to the subject is, to describe what I think is the best way of preparing and using the balsam with chloroform. I take a quantity of the oldest balsam I can procure, and place it in an open glass cup, (if with a lip all the better.) I pour on and mix with it as much chloroform as will make the whole quite fluid, so that a very small quantity will drop from the lip of the containing vessel. Having thoroughly mixed, I pour the prepared balsam into long thin half-ounce phials, and, after corking up, set them aside for at least one month, now and then turning the corks about to keep them loose. It is well to have a stock on hand of three different degrees of dilution, as a much thicker balsam is required for some preparations than others. The advantage I find from having a quantity of balsam prepared beforehand is, that it becomes much clearer, and shows less of that yellow tinge which is observable in most samples when first mixed. Another very important point is, that it *sets much quicker than if only mixed as wanted*, and there is very little waste. Air bubbles also escape more rapidly. I do not use heat either to the balsam or the glass slide, nor, in fact, in any part of the process. My custom is to save up a number of objects for mounting, and then put up a quantity at any favorable opportunity. Those which have been immersed for some time in turpentine need only to be rinsed in a little perfectly clean turpentine, placed in a proper position on the glass slide, a sufficient quantity of balsam *dropped from the lip of the half-ounce bottle*, and then, by the aid of a pair of forceps, the cover laid gently over without delay. Except in rare cases, the cover should not be put under pressure after being once laid on, as many objects are liable to be distorted by pressure while the balsam is setting. As soon as a number of slides have been finished they may be labeled and arranged (flat of course) in the cabinet, and will require no further attention. In a few days, or, at most, a week, the slides may be safely used with care, and in the course of a fortnight the balsam will be firmly set. (Should specimens be wanted very quickly, the drying may be hastened by placing the slides on a warm shelf in a hot kitchen, or any similar place.) Such objects as the pollen of flowers, the thecæ of ferns, spores of mosses, and some seeds, only require to be dry to be mounted with perfect safety. Should they contain moisture, the preparation will probably become milky and clouded. In consequence of the extraordinary facility with which the fluid penetrates every portion of a specimen, the air-pump is not needed; for if the object is surrounded with bubbles on all sides at the time of mounting, yet on examination, after a day or two, it will be discovered that the bubbles have all disappeared, and the specimen will be so beautifully transparent that it will appear to be set in plate glass. There is another advantage in having a stock of prepared balsam at hand: should you wish to mount only one or two slides no troublesome preparation is needed, nor is there the least waste of time or material; for you have only to adjust your object on the slide, pour on a drop or two of the balsam, put on the cover, and the work is ended. Those microscopists who have mounted objects in Canada balsam upon the old plan will well remember how troublesome it was, and the great care required to have the balsam, slide, and cover all of the right temperature.

They will remember also how often, owing to the complicated nature of the operation, the specimen was either spoilt or imperfectly displayed. By adopting the plan just described all this annoyance and uncertainty will be obviated. If an object happens to be in an awkward or unfavorable position, the cover can be raised and all set right with the greatest ease. Being clean, simple, and easy, this method offers every encouragement to students to mount their own preparations. Nothing so much deters from mounting microscopic preparations as the idea that so much trouble will be incurred in getting all ready before anything can be done. I must not omit to mention that, with proper care, there need be no cleaning off of surplus balsam, for it is so easy to calculate the exact quantity required for a given object, and this can be regulated with such nicety, that only as much need be dropped on the preparation as will be just sufficient for the purpose.”—(*Quarterly Jour. of Microscopical Science.*)

“*Flow of Solids under Pressure.*—M. H. TRESCA has communicated a paper on this subject to the French Academy, in which he details experiments to show that ‘solid bodies can, without change of condition, flow (*s’écouler*) after the manner of liquids, if sufficient pressure is exerted upon them.’ His method consists in operating upon solids composed of separate pieces, the joints of which are known before the experiment begins, and so that their position after the trial indicates the amount and kind of displacement that has been produced. When a block composed of discs (*rondelles*) was placed in a cylinder and exposed to pressure on one of its bases, in some cases amounting to 100,000 kilogrammes, and allowed to flow through a round hole, concentric with the cylinder, it was found that the plane surfaces of the discs were modified so as to form surfaces of revolution in the jet, which were almost cylindrical, descending into it to greater or less distance, and ending in a cap (*calotte*) turning its convexity toward the extremity of the jet. The tubes thus formed were perfectly continuous, and fitted one to each other, so that each line of junction was represented in slices cut at right angles to the axis of the jet. ‘These lines,’ says the writer, ‘show that all the molecules composing the primitive block came individually to take their place in the jet exactly as the molecules of a running liquid do.’ M. Tresca thinks that operations of this kind may explain certain geological cases of intrusion of one rock into another.”—(*Intellectual Observer.*)

“*New Facts on Cast Irons and Steels.* By M. JULLIEN.—The author has adopted Karsten’s views of the constitution of cast iron, steel, and alloys, but modifies them by asserting that metals do not combine with one another, but one metal dissolves in another. The object of the long memoir presented to-day is to demonstrate—1st, that metals do not combine with each other; 2d, that iron does not combine with either carbon, silicon, or nitrogen; and 3d, that a mixture of hydrate of lime and dry hydrated sulphate of soda presents all the characters of a solution, but none of those of a combination. M. Jullien then gives us his ideas on the constitution of irons and steels in a series of propositions, of which we have only space for one or two. Liquid cast iron, he says, is a solution of liquid carbon in liquid iron. Soft steel is a solution of amorphous carbon in either amorphous or crystallized iron. Gray pig, obtained by casting in hot moulds or sand, is a mixture of graphite and steel, the components, iron and carbon, being both in the amorphous state. We will

quote one more assertion. Graphite being amorphous, carbon cannot crystallize without becoming diamond; the supposed crystals of graphite are really casts of other crystals. The author then gives some other consequences which flow from his theory. Liquid glass, he says, is the solution of a neutral silicate in one of its components. Granite is a liquid glass cooled slowly. Lava, liquid glass cooled suddenly. Bronze cooled slowly, a solution of crystallized tin in amorphous copper. Bronze cooled suddenly, a solution of amorphous tin in amorphous copper. Red phosphorus is the amorphous condition of an allotropic state of phosphorus, the crystalline form of which is not yet known."—(*Paris Correspondent of Chem. News.*)

Burning Mirrors.—"Burning Mirrors have been celebrated on account of their size and extraordinary effects. One of these optical machines was the work of Stettala, a canon of Milan; it was parabolic, and, acting as a burning-glass, inflamed wood at the distance of fifteen or sixteen paces. Leonard Digges, in his *Pantometria*, 1571, states that 'with a glasse framed by a revolution of a section parabolically, I have set fire to powder half a mile and more distant.' In the prosecution of this subject, the celebrated Napier and Sir Isaac Newton experimented with parabolic reflectors before 1673. Vilette, an artist and optician of Lyons, constructed three mirrors, about the year 1670; one of these, which was purchased by the King of France, was thirty inches in diameter, and of about three feet focus. The rays of the sun were collected by it into the space of about one inch. It immediately set fire to the greenest wood; it fused silver and copper in a few seconds; and in one minute vitrified brick and flint earth. A mirror, superior even to these, was constructed by Baron von Tchivnhausen, about 1687; it consisted of a metal plate, twice as thick as the blade of a common knife; it was five feet three inches in breadth, and its focal distance was three feet six inches. It produced the following effect: wood, exposed to its focus, immediately took fire; copper and silver passed into fusion in a few minutes; and slate was transformed into a kind of black glass, which, when laid hold of with a pair of pincers, could be drawn out into filaments. Pumice-stone and fragments of crucibles, which had withstood the most violent furnaces, were also vitrified.

"The burning lens constructed by Mr. Parker many years since, at an expense of upwards of \$7000, was of flint glass, three feet in diameter, and weighed 212 pounds; the focal length between six feet eight inches, and the diameter of the focus one inch. To concentrate the rays still further, a second lens was used, and reduced the diameter of the focus to half an inch. Under this kind of lens every kind of wood took fire in an instant, whether hard or green, or even soaked in water. Thin iron plate grew hot in an instant, and then melted. Tiles, slates, and all kinds of earth, were instantly vitrified. Sulphur, pitch, and all resinous bodies, melted under water. Fir-wood, exposed to the focus under water, did not seem changed, but when broken, the inside was burnt to a coal. Any metal whatever, inclosed in charcoal, melted in a moment, the fire sparkling like that of a forge. When copper was melted, and thrown down quickly into cold water, it produced so violent a shock as to break the strongest earthen vessels, and the copper was entirely dissipated. Though the heat of the focus was so intense as to melt gold in a few seconds, yet there was so little heat at a short distance from the focus, that the finger might be placed an inch from it without injury. Mr. Parker having put

his finger at the focus to try the sensation, found it not to resemble that produced by fire or a lighted candle, but like that of a sharp cut with a lancet."—(*Christian Inquirer*.) —

"*Constant Battery to be applied to the Manufacture of Magnesium.* By ARTHUR REYNOLDS, B.Sc.—It has occurred to me that a constant and cheap battery might be made, by employing for an exciting liquid a solution of perchloride of iron, and for the metal to be attacked, metallic iron, the copper plate being replaced by carbon.

"The most convenient form of the battery would be to have pots made of carbon for holding the liquid. Slits cut in a thick plate of gas retort carbon would do. The action of the battery would be quite constant, as the exciting liquid would always remain in the same condition, the iron dissolving by reducing the solution to protochloride, which being oxidized by the air would be deposited, so that the solution would always remain of the same strength.

"This would be as cheap, or cheaper than any other form of battery, and perpetually constant, and the same acid would do for a long time.

"The purpose for which I propose to employ the battery is, to the manufacture of magnesium from sea-water. The sea-water should be evaporated with a little chloride of calcium, and after the main bulk of the common salt and sulphate of lime has crystallized out, the solution should be evaporated to dryness, the dry mass melted, and decomposed by the voltaic battery before described. This process would be sure to succeed."—(*Chem. News*.) —

"*On Drops.*—MR. GUTHRIE, Professor of Chemistry and Physics at the Royal College, Mauritius, has made to the Royal Society an elaborate communication on Drops, from which we extract the 'laws' which he deduced from his observation:—

"*Law 1.*—The drop size depends upon the rate of dropping. Generally, the quicker the succession of the drops, the greater is the drop; the slower the rate, the more strictly is this the case. This law depends upon the difference, at different rates, of the thickness of the film from which the drop falls.

"*Law 2.*—The drop size depends upon the nature and quantity of the solid which the dropping liquid holds in solution. If the liquid stands in no chemical relation to the solid, in general, the drop size diminishes as the quantity of solid contained in the liquid increases. The cause of this seems to be that the stubborn cohesion of the liquid is diminished by the solid in solution. When one or more combinations between the liquid and solid are possible, the drop size depends upon indeterminate data.

"For example: certain variations in the drop size of solutions of chloride of calcium of different strengths point to the existence of definite hydrates; while the regularity of the variation of drop size in the case of nitrate of potash points to the absence of hydrates.

"*Law 3.*—The drop size depends upon the chemical nature of the dropping liquid, and little or nothing upon its density. Of all liquids examined, water has the greatest, and acetic acid the least drop size. It is remarkable that butyric acid, which has sensibly the same specific gravity as water, gives rise to a drop less than half the size of the water drop.

"*Law 4.*—The drop size depends upon the geometric relation between the solid and the liquid. If the solid be spherical, the largest drops fall

from the largest spheres. Absolute difference in radii takes a greater effect upon drops formed from smaller, than upon those formed from larger spheres. Of circular horizontal planes, within certain limits, the size of the drop varies directly with the size of the plane.

"The fact that the drop increases in size according as the radius of the sphere increases from which the drop falls, and that the difference from this cause may amount to half the largest drop size, the author regards as important to dispensers of medicine. The lip of a bottle from which a drop falls is usually annuloid. The amount of solid in contact with the dropping liquid is determined by the size of two diameters, one measuring the width of the rim of the neck, the other the thickness of that rim. In most cases the curvature and massing of the solid at the point whence the liquid drops is so irregular as not to admit of any mathematical expression.

"*Law 5.*—The drop size depends upon the chemical nature of the solid from which the drop falls, and little or nothing upon its density. Of all the solids examined, antimony delivers the smallest, and tin the largest drops.

"*Law 6.*—The drop size depends upon temperature; generally the higher the temperature the smaller the drop. With water the effect of a change of temperature of 20° C. to 30° C. is very small.

"*Law 7.*—The nature or tension of the gaseous medium has little or no effect upon drop size."—(*Am. Druggists', Circ.*)

"*Purification of Chloroform for Anæsthesia.*—M. ADRIAN, who is a pharmaceutical chemist, observes that there are many impurities in much of the chloroform sold in the present day, such as alcohol, chlorine, hydrochloric acid, ether, and compounds of methyle, aldehyde, water, fixed matters, etc. Some of these substances are easily recognized by chemical agents, but others which resemble chloroform itself can only be detected by a careful examination. M. Adrian, having had occasion to purify some of the chloroform required in his establishment, has found that the complete absence of foreign matters sensible to reagents was not a sufficient indication of purity, and he proposes the following processes for rendering the anæsthetic perfectly pure. It should first be shaken with water to remove the alcohol, and these washings should be repeated several times, and the complete absence of water should be proved by chromic acid and recently prepared binitrosulphuret of iron, the former of which is not decomposed, and the latter remains insoluble when the chloroform is quite free from alcohol. The water also removes any aldehyde which may be present. When the chlorine and its derivatives have been for the most part removed by the previous processes, the chloroform is put in contact with a weak solution of carbonate of soda, which saturates the last traces of chlorine, as well as the hydrochloric and hypochlorous acids which may remain in solution. The water retained in the solution by the chloroform is removed by digestion for twenty-four or forty-eight hours with chloride of calcium, and a considerable quantity of this salt must be used, and the process repeated at several intervals. After this purification, the density and the boiling point of the chloroform should be accurately determined in order to secure the complete absence of the chlorides of methyle. If the point of ebullition exceeds the sixty-first degree, and rises, as M. Adrian has seen, to the sixty-eighth, (centigrade,) the chloroform must be subjected to another series of rectifications."—(*Bull. Gén. de Thérap. and Brit. and For. Med.-Chir. Rev. and Dublin Med. Press.*)

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, APRIL, 1865.

No. 9.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Caries and Necrosis of the Alveoli and Maxillary Bones.—It was remarked, in an article on caries and necrosis of bone, that it was necessary for every dentist to understand their treatment; still, it does not follow that he must treat them. It might be remarked, also, that he cannot be too cautious how he proceeds, in case it falls to his lot to treat such affections. Surgeons speak of three kinds of operations where they apply to the bones generally, namely, the “removal of the diseased part only;” the “excision of the carious articular end;”—in the “amputation of the whole of the bone affected.” These operations, when they apply to the jaws, require a great deal of judgment as to when they are proper. The dentist is scarcely ever called upon to treat caries or necrosis, except when they occur from traumatic causes. In such cases he requires only to keep the parts clean, and remove portions of bone as they become loose. If they occur from constitutional causes, the health of the patient must first be cared for; correct whatever vice there may be in the system, if such condition should exist; if not, and debility or defective nutrition only attends the case, stimulate and build up the system as fast as possible; for it is only through and by the aid of the vital forces that he can hope to succeed in accomplishing an effectual cure. The bones of the face and alveoli are spongy, of a loose texture, except the body of the inferior maxillary, and, if caries or necrosis sets in at a given point, there is no knowing where it will stop; hence, to cut away a diseased portion is not sufficient to insure an arrest of the disease, because the whole bone may be deteriorated in its character, and the wound that is made by the removal of a part may not heal, and, unless it is pretty nearly certain that a part can restore itself,

it is not well to cut away fragments until signs of detachment occur or the vital forces indicate where the division between the healthy and unhealthy tissue exists. Local stimulants, which tend to invite blood to the part, help to detach the dead portions from the living bone and aid the process of healing. We can do nothing but aid nature, and it is not often that we wait too long on her, except where dead portions of bone are entirely detached and are held merely in the meshes of the surrounding structures or integuments. Such dead portions, under such circumstances, only tend to aggravate adjacent bone to increased and extended disease at this point. We think a great deal of error prevails in regard to the treatment of the diseases of the bones of the alveoli and jaws, as waiting for disintegration or absorption of bone in them is different from the longer and more compact bones of the body. As remarked above, delay in these may favor the extension of the disease; hence, to keep the parts as free as possible of the presence of foreign substances is essential.

It is remarked by Erichsen, that "the *process of separation* of the dead bone, and the formation of new osseous tissue to supply the place of that which is necrosed, is one of the most interesting phenomena that the surgeon can study. The separation of the dead bone, or its *exfoliation*, is precisely similar to the mode in which a slough in soft parts separates, the time required being the only difference. Inflammatory action is set up so as to form a true line of demarkation and of separation in the substance of the bone that is still living, and that is immediately contiguous to that which has lost its vitality." After describing the manner in which the process takes place, he further says: "When once the dead bone has been detached by the formation of this line of separation, nature adopts steps for its ultimate removal from the body, there being no evidence that it ever, under any circumstances, undergoes absorption." Mietscher "has shown that the detachment of small scales of bone may take place by the disintegration of their substance by a process of 'insensible exfoliation,' as he terms it. This process is a purely mechanical or physical one, and probably goes on in all dead bone that is in contact with pus: just as we see it take place in the ivory pegs used in the treatment of ununited fracture."

If these statements be true, then the whole story is told, and the treatment indicated, of the necrosis of the alveoli and maxillary bone, to which the attention of the dentist may at any time be called. There is no doubt that the diseases of each class of bones of the system require special points of difference in treatment, but the general plan holds good in all. It is not possible to remove dead bone in some localities with impunity: hence it is necessary to wait upon nature; but, as a general rule, in the treatment of the jaws, portions can be removed after other means have been resorted to without danger to the patient, or incurring graver difficulties to his health.

(To be continued.)

A CONCISE AND PRACTICAL DESCRIPTION OF THE ANATOMY OF THE FIFTH PAIR OF NERVES.

BY JAS. E. GARRETSON, M.D., D.D.S.

THE FIFTH PAIR OF NERVES.—An ENCEPHALIC NERVE, that is, coming off from that portion of the cerebro-spinal centre lying within the cranium. Called the fifth, because this is the order of its emergence. Called also trifacial, because, while within the cranium, it divides into three portions, which portions, in their divisions and subdivisions, are distributed respectively to the superior, middle, and inferior portions of the facial region. Called also “trigeminus,” a name derived from *tri*, three, and *geminus*, twin, or double, signifying literally three double, triple; referring to its threefold divisions.

The fifth—*Trifacial* or *Trigeminus*—is first discovered as a number of filaments, of which there are two distinct sets, coming off from the sides of the pons varolii; this is called its superficial origin. The deep, or true origin, can be traced into the substance of the pons as far as the lateral tract of the medulla oblongata. These filaments of origin are called the roots of the nerve, and being twofold, afford the likeness which exists between this particular encephalic nerve and those of the spinal cord.

The fifth nerve is peculiar in being both compound and special. That is to say, it supplies parts with filaments of sensation, filaments of motion; and through one of its branches called the “gustatory,” with filaments which pertain to the sense of taste. It is the great sensitive nerve of the head and face. The nerve of motion to the muscles of mastication. The nerve of the sense of taste to the anterior part of the tongue. (See Function of Nerve, page 483.)

Immediately on the emergence of the roots from the points of their superficial origin, they pass through a slit-like opening in the dura mater at the apex of the petrous portion of the temporal bone. Here the larger root, called the sensor, enters a ganglion, lying in a fossa on the anterior face of this triangular apex—the Gasserian or semilunar.

The *Ganglion of Gasser* is a small, reddish-gray, semilunar knot, enveloping apparently, the great or posterior root of the fifth nerve as it passes over the temporal apex; its size is equal, perhaps, to that of an ordinary buckshot, although from its flattened and crescentic form, the measurement from tip to tip of its horns would surpass somewhat the diameter of such a shot. The convex face of the ganglion looks forward.

On emerging from this ganglion, the posterior root is found divided into three cords—the three primary divisions of the sensitive portion. The first of these cords constitutes what is called the ophthalmic nerve,

or the ophthalmic portion or division of the fifth nerve. The second cord, the superior maxillary nerve, or superior maxillary division of the fifth. The third, the inferior maxillary nerve.

The first of these nerves has its distribution over the orbito-frontal region.

The second has its distribution over the superior maxillary region.

The third associates with the lesser, or motor root, which root first connects with it at the base of the skull, and has its distribution over the inferior maxillary region.

OPHTHALMIC NERVE.—This division of the fifth passes from the Gasserian ganglion along the outer wall of the cavernous sinus, and enters the orbit through the sphenoidal fissure; before entering which, however, it breaks up into three branches. These branches supply the eyeball, the lachrymal gland, the mucous lining of the nose, and the muscles and the integument of the forehead. They are called frontal, lachrymal, nasal. The ophthalmic is the smallest of the three divisions of the fifth. It is a flattened band not more than an inch in length, receiving, before breaking up into its terminal branches, filaments from the carotid plexus of the sympathetic, and giving off two or more filaments, which, with a branch from the fourth nerve, pass between the layers of the tentorium.

The Frontal Branch is the largest of the divisions of the ophthalmic, and is commonly regarded as the continuation of the nerve. In the orbit it lies above the levator palpebræ muscle, between it and the periosteum, dividing about midway of the cavity into two branches—supra-trochlear and supra-orbital.

The supra-trochlear branch passes inward to the pulley of the superior oblique muscle, giving off here descending filaments which anastomose with similar trochlear filaments from the nasal nerve. A second, or terminal branch, passes from the orbit between the superior oblique and supra-orbital foramen, ascends behind the corrugator supercilii, and occipito-frontalis muscles, to both of which it distributes filaments, and is finally lost in the integument of the forehead.

The supra-orbital branch, or division, of the frontal, passes forward until it reaches the supra-orbital foramen, when it passes out unto the forehead. In this situation it gives off a number of filaments to the upper eyelid, called palpebral. In its distribution over the forehead, it sends branches to the orbicularis palpebrarum, occipito-frontalis, and corrugator supercilii muscles, anastomosing in the first named muscles with filaments of the facial nerve. Other two sets of terminal filaments supply, the first, the periosteum covering the frontal and parietal bones; the second, the integument, as far back as the occiput.

The Lachrymal.—This is the smallest of the three divisions of the ophthalmic. It is almost always accompanied by filaments from the

fourth nerve. In the orbit it connects itself with the orbital branch of the second, or superior maxillary division of the fifth nerve. Its distribution is to the lachrymal gland, the conjunctiva, and the integument of the upper eyelid, in which last situation it joins with filaments of the facial nerve.

The *Nasal*.—This division is intermediate in size between the frontal and lachrymal. Entering the cavity of the orbit between the two heads of the external rectus, it passes directly across the optic nerve to the anterior of the ethmoidal foramina; through this foramen it passes into the cavity of the cranium, where it traverses to the shallow groove on the front of the cribriform plate of the ethmoidal bone, until, arriving at the nasal slit, it passes directly downward into the nose, terminating in two branches. Of these two branches, the external descends on the inner surface of the nasal bone, supplying the mucous membrane of its neighborhood; leaving the cavity at the juncture of the bone with the lateral cartilage, it passes on the external part of the nose down to supply the integument of the lips, and join with the facial nerve. The second branch, the internal, supplies the mucous membrane about the front of the septum.

In the orbital cavity are given off three branches from the nasal,—the ganglionic, ciliary, and infra-trochlear.

The ganglionic is a slender cord, about half an inch in length, which is the sensor filament to the orbital, or ophthalmic ganglion. (See Ganglia.)

The ciliary, called long ciliary, to distinguish them from certain shorter branches, called also ciliary, given off from the ophthalmic ganglion, are two or three in number, and, in association with the short ciliary, pierces the posterior face of the sclerotic, and, passing between this coat and the choroid, are distributed to the ciliary muscle and iris.

The infra-trochlear branch is given off just as the main portion passes into the ethmoid foramen, joining beneath the pulley of the superior oblique muscle, with a filament of the supra-trochlear nerve; this branch continues to the inner angle of the eye, where it is distributed to the orbicular muscle, the integument of the eyelid, and side of the nose, to the conjunctiva, caruncula lachrymalis, and lachrymal sac.

Recapitulation.—The ophthalmic, or first division of the fifth nerve, supplies the tentorium, lachrymal gland, caruncula lachrymalis, lachrymal sac, ciliary muscle and iris, muscles of eyelid and forehead, integument of forehead and nose, mucous membrane of eye and nose, and pericranium of frontal and parietal regions.

SUPERIOR MAXILLARY NERVE.—This nerve or division arises, as a flattened band, from the middle of the Gasserian ganglion. It passes forward over the greater wing of the sphenoid bone, until, reaching the foramen rotundum, it leaves the cranium and presents itself in the speno-maxil-

lary fossa; from this fossa it passes to the orbital cavity, through the speno-maxillary fissure, where, being lodged in the infra-orbital canal, it continues forward to the points of its ultimate distribution.

Branches of Distribution.—1. In the speno-maxillary fossa—three in number—orbital, ganglionic, posterior dental.

The *Orbital* enters, with the main branch of the nerve, the orbital cavity, and divides into two branches, temporal and malar. The temporal branch passes from the orbit through a foramen in the malar bone, and enters the temporal fossa; it here perforates the temporal muscle and fascia, and is distributed to the integument covering the side of the head, and associates with the facial nerve, and an ascending branch, auriculo-temporal, of the inferior maxillary. The malar branch leaves the orbit also through a foramen in the malar bone, perforates the orbicularis palpebrarum muscle, and joins with a branch of the facial.

Ganglionic, two in number.—They drop directly down into the spenopalatine, or Meckel's ganglion; hence are commonly known as the spenopalatine branches.

Posterior Dental.—This branch arises from the trunk just as it enters the orbit; it instantly breaks up into an anterior and posterior portion. The first supplies the gums and buccinator muscle. The second pierces the tuberosity of the maxillary bone, and after forming a minute plexus above the alveolus, distributes filaments to each of the posterior teeth; its termination is lost in an union with the anterior dental nerve.

2. *In the Infra-Orbital Canal.*—One. The Anterior Dental. This branch is given off about midway of the canal. It enters a second canal existing on the anterior face of the maxillary sinus, and curving backward, associates itself, as above alluded to, with the posterior dental; from the curve are given off filaments to the anterior teeth—incisors, canines, and bicuspid.

3. *On the Face.*—Three. Palpebral, Nasal, Labial. These are the terminal filaments, the division occurring as the nerve issues from the infra-orbital foramen. The palpebral filaments pass up to the supply of the orbicularis palpebrarum muscle and the integument and conjunctiva of the lower eyelid; at the outer angle of the orbit they associate with the malar branch of the orbital and filaments of the facial nerve. The nasal filaments pass across the nose, supplying the muscles and integument of this region; they usually join at the tip with the nasal branch of the ophthalmic. The labial filaments pass downward beneath the levator labii superioris, and are distributed to the muscles and integument of the upper lip, to the mucous membrane of the mouth, and to the labial glands. The intricate plexus situated in the canine fossa is formed of filaments from the facial nerve associating with twigs of the trimaxillary division.

Recapitulation.—The superior maxillary nerve, or second division of the fifth, supplies the integument on the side of the head, Meckel's gan-

gion with its sensor filaments, the teeth, the antrum, orbicularis palpebrarum muscle, integument, and conjunctiva of lower eyelid, muscle and integument of nose, muscles, integument, and mucous membrane of superior lip and labial glands.

INFERIOR MAXILLARY NERVE.—This nerve, or division, is the largest of the three, and constitutes, justly speaking, the only portion of the fifth nerve compound in character. The sensor portion is the third of the cords emerging from the Gasserian ganglion; the motor portion is that lesser root alluded to as coming off from the pons varolii; the sensor cord falls quickly into the oval foramen of the sphenoid bone, through which it passes from the cranium. The motor cord which has passed forward beneath the Gasserian ganglion, unites with the sensor just as it emerges from this foramen. Here then is made, by this union, a single cord, the perfected or compound inferior maxillary nerve—a nerve made up of filaments of motion and filaments of sensation. At the point of juncture of these two cords is found a little ganglion, the otic. (See Ganglia.)

Immediately beneath the base of the skull, this compound inferior maxillary nerve divides into two branches—anterior and posterior. Into the anterior branch passes most of the motor filaments.

The *Anterior Branch* breaks up into five divisions, and is distributed to the muscles of mastication. These divisions, or branches, receive names from the parts supplied by them; they are masseteric, buccal, deep temporal, and pterygoid.

The *Posterior Branch* is the larger of the two divisions; it subdivides into three parts. These supply the inferior teeth, tongue, and auriculo-temporal region. Hence the branches are named inferior dental, lingual, and auriculo-temporal.

DIVISIONS OF ANTERIOR BRANCH.—*Masseteric.*—This branch runs across the sigmoid notch of the inferior maxillary bone, enters the substance of the masseter muscle, and is distributed in it. In crossing the notch it occasionally gives off a filament to the articulation.

Deep Temporal Branches.—They are two in number. They pass under the temporal muscle, and supply its deep surface.

Buccal.—This branch pierces the external pterygoid muscles, passes down beneath the coronoid process of the jaw, pierces the fibres of the temporal muscle, and, reaching the buccinator, divides upon it into a superior and inferior branch. The superior supplies the upper part of the muscle and the integument; the inferior supplies the lower part of the muscle and its lining mucous membrane.

Pterygoid Branches.—Two in number. One supplying each pterygoid muscle.

DIVISIONS OF POSTERIOR BRANCH.—*Auriculo-Temporal.*—This branch passes out to the inner side of the temporo-maxillary articulation, turns upward in company with the temporal artery; and on emerging with this

vessel from beneath the parotid gland, divides into two branches. The posterior of the two supplies the *attrahens auren*, the pinna, and the neighboring integument. The anterior passes upward with the terminal branches of the artery, and is distributed to the temporal integument. Branches of communication exist between the auriculo-temporal nerve, the facial, and the otic ganglion. The articulation, the parotid gland, and the external auditory meatus receive nerve endowment from the auriculo-temporal.

Lingual or Gustatory.—This branch is a nerve of special sense, presiding in part over the action of taste; its terminal filaments, as might be inferred, are distributed extensively to the papillæ and mucous membrane of the tongue. Of the three sets of papillæ, the filiform and fungiform, or those situated on the anterior, two-thirds of the organ receive the principal supply, the posterior or great papillæ being supplied from the glosso-pharyngeal. On this account it was deduced that the gustatory presided over taste only as the anterior two-thirds of the tongue was concerned; and which inference has been abundantly borne out by vivisection. (See Todd and Bowman, *pages* 385, 86, 87, 88, 89, and 90.) In the dissection, the gustatory branch is seen coming off just opposite the sigmoid notch. In company with the inferior dental nerve, or branch, it passes down along the inner side of the ramus, until, leaving the dental somewhat above the posterior dental canal, it crosses obliquely to the side of the tongue, along which it pursues its way to its points of final termination, anastomosing at the tip of the organ with filaments of the hypo-glossal. In its course it lies first beneath the external pterygoid muscle, crosses the internal pterygoid, rests upon the superior constrictor of the pharynx, runs over Wharton's duct, where it reaches the apex of the tongue. In its course, branches of communication are given off to the submaxillary ganglion and the hypo-glossal nerve.

Inferior Dental Nerve or Branch.—This is the largest of the three divisions of the inferior maxillary nerve. Between its point of origin and entrance into the dental canal, it gives off a branch—the mylo-hyoid—distributed to the mylo-hyoid and anterior belly of the digastric muscles. The main portion, after entering the posterior foramen of the dental canal, pursues its way beneath the teeth, giving, in its course, filaments to all these organs, terminating finally in a branch—the mental—which passes from the canal at the mental foramen, and has its distribution in the muscular and cutaneous substance of the inferior lip.

Recapitulation.—The inferior maxillary nerve, or third division of the fifth, supplies the muscles of mastication, the auriculo-temporal region, the anterior two-thirds of the tongue, the mylo-hyoid, and digastric muscles, the inferior teeth, and the muscles and skin of the lower lip.

GANGLIA OF THE FIFTH PAIR OF NERVES.—Associated with the fifth nerve are six ganglia: they are called Gasserian; Ophthalmic, lenticular, or ciliary; Meckel's or sphenopalatine; Nasopalatine or ganglion of Cloquet; Otic; Submaxillary.

Ganglion of Gasser.—This ganglion, called as frequently the semi-lunar, from its shape, is found lying in a slight depression on the anterior face, near the apex of the petrous portion of the temporal bone. It receives the posterior or sensor cord of the fifth nerve, and transmits it divided into three parts. The ganglion receives filaments from the carotid plexus of the sympathetic, and gives off filaments to the tentorium cerebelli, and to the dura mater of the middle fossa of the cranium.

Ophthalmic, Lenticular or Ciliary Ganglion.—This ganglion, as implied in its name, is found in the cavity of the orbit. It is a small quadrangular flattened body, not larger, generally, than the ordinary pin head; it is situated between the external rectus muscle and optic nerve, well enveloped in the mass of fat found occupying this portion of the cavity. Its branches of communication are derived: the first, or sensor, from the nasal; the second, or motor, from the third nerve; the third, or sympathetic, from the cavernous plexus. Its branches of distribution are the short ciliary nerves. These nerves, ten or twelve in number, arise from the anterior face of the ganglion, being connected, as two sets of filaments, with the superior and inferior angles. The two sets pass forward, one being above, the other below the optic nerve, until, reaching the sclerotic coat of the eye, they penetrate this organ, and are distributed to the ciliary muscle and iris.

Meckel's Ganglion—Spheno-Palatine.—This is the largest and most extensively connected of the cranial ganglia. Its position is in the spheno-maxillary fossa, immediately in front of the vidian foramen. In shape it is triangular, and in color reddish-gray. Its branches of communication are derived: the first, or sensor, from the superior maxillary nerve, which, as has been seen, gives to it two filaments while crossing the fossa; the second, or motor, from the facial nerve, or rather from the intumescencia gangliformis of that nerve. This branch is known as the great petrosal nerve; it emerges from the fallopian canal through the hiatus fallopii, passes along the groove leading from this foramen, until, reaching the foramen lacerum basis cranii, it pierces the cartilaginous substance, filling up this osseous break, and entering the vidian canal, associated with the carotid nerve, passes forward under the name of vidian to the ganglion. The third, or sympathetic, is derived from the carotid plexus through the vidian.

The branches of distribution from this ganglion are numerous, and supply a portion of the orbital periosteum; the nares, the hard and soft palates, the half-arches, the tonsil, the pharynx, etc.

The ascending branches, two or three in number, enter the orbit through the spheno-maxillary fissure, and supply the periosteum.

The descending, called palatine branches, are three in number: the anterior of these, or large palatine nerve, descends through the posterior palatine canal, passes along the groove on the hard palate, and is dis-

tributed to the gums, the mucous membrane, and palatine glands, anastomosing back of the incisor teeth with the naso-palatine nerve; while, in the palatine canal, filaments are given off which pass to the middle and inferior turbinated bones.

The middle branch, called external palatine nerve, descends through the same canal as the preceding; it distributes its filaments to the soft palate, to the uvula, and the tonsil.

The posterior, called small palatine nerve, descends through the accessory palatine canal, and emerges back of the posterior palatine foramen. It is distributed to the levator palati muscles, the soft palate, tonsil, and uvula.

There are two sets of branches coming off from the internal surface; these are called superior nasal and naso-palatine.

The superior nasal, four or five in number, enter the nasal fossa by the spheno-palatine foramen; they supply the mucous membrane of the superior portion of the fossa.

The naso-palatine enters the fossa with the other nasal nerves, passes across the roof of the nose, until, reaching the septum, it descends between the periosteum and mucous membrane to the anterior palatine foramen; passing through this canal, it unites with its fellow of the opposite side, and distributes its filaments to the mucous membrane about the incisive fossa.

Naso-palatine Ganglion or Ganglion of Cloquet.—This is simply the small swelling situated in the incisive fossa, the result apparently of the union of the naso-palatine nerves. The very name of ganglion is denied it by most writers.

Otic Ganglion.—This is an oval flattened body, of small size, lying on the sensor portion of the inferior maxillary nerve, immediately beneath the oval foramen. Its branches of communication are, by sensor filaments with the auriculo-temporal nerve, by motor with the inferior maxillary nerve, and with the sympathetic by the plexus surrounding the middle meningeal artery. Branches of communication also exist with the glossopharyngeal, and through the medium of the lesser petrosal with the facial nerve.

The branches of distribution are two in number: one to the tensor tympani, and one to the tensor palati muscles.

Submaxillary Ganglion.—This is a small-sized circular ganglion, situated upon the submaxillary gland. It is connected, through communicating branches, with the gustatory nerve, sensor; with the facial, through the medium of the chorda tympani, motor; and with the sympathetic by filaments from the plexus of the nervi molles.

The branches of distribution are five or six in number; they arise from the lower part of the ganglion, and supply the duct of the gland and mucous membrane of the floor of the mouth.

FUNCTION OF THE FIFTH NERVE.*—"The determination of the functions of the roots of spinal nerves has afforded the clue to that of the functions of the roots of the fifth nerve. The analogy of the smaller root of the fifth with the anterior spinal root, and of the larger one with the posterior spinal root has long been admitted by anatomists. Hence an analogy of function must be admitted, and the former must be viewed as consisting of motor fibres, the latter of sensitive ones; and by tracing each of the three great divisions of the nerve, we may determine its function by its constitution, according as it derives its fibres from either root or from both. The ophthalmic and superior maxillary are composed of fibres derived exclusively from the larger root; they are, therefore, sensitive nerves. The inferior maxillary consists of fibres derived from both roots, and consequently is both motor and sensitive. Sir C. Bell, in his original exposition of the functions of this nerve, fell into error from having neglected to avail himself of this method of analyzing the constitution of each of its three divisions from which he would have seen that it is the inferior maxillary alone which derives its fibres from both roots, and which perfectly resembles a spinal nerve in constitution.

"The distribution of the three divisions of the fifth nerve confirms most amply the view of its physiology suggested by the anatomy of its origin. The ophthalmic and superior maxillary are distributed entirely to sentient surfaces, or anastomose with motor nerves, (the facial.) They supply the skin of the forehead, of the eyelids, the conjunctiva, the eyeball, the mucous membrane of the nostrils, the integuments of the face, the upper lip, the nose, the beard on the upper lip, the integument of the ear, the temple, and the whiskers; they are the sensitive nerves to these regions. The inferior maxillary has two distinct sets of branches, the one by which the muscles of mastication are supplied—the other, which go to the integuments of the lower lip and chin, and the beard, and the mucous membrane of the mouth and tongue. This nerve is, therefore, the nerve of mastication, and of sensation to the surfaces above named.

"Repeated experiments in the hands of various physiologists, none of which, however, were more conclusive than those of Mayo, indicate the same views of function. Division of the ophthalmic or of the superior maxillary induced loss of sensibility without muscular paralysis, leaving only such an impairment of the motor power as destruction of the sensitive nerves invariably produces, by impairing the power of exact adjustment, for which a high degree of sensibility is necessary. But when the inferior maxillary nerve was cut, then both the power of mastication was destroyed on the same side, and the sensibility of the lower part of the face and tongue was lost. If the nerve were divided in the cranium, the whole side of the face and forehead, with the eyeball and nose, became insensible, and the muscles of mastication were paralyzed. Irritants might

* See Todd and Bowman.

then be applied to the eyeball, without exciting winking, or causing pain, and strong stimulants might be introduced into the nostrils without creating the least irritation. When the trunk of the nerve within the cranium of an ass was irritated, the jaws closed with a snap from the excitation of the motor fibres, which are distributed to the muscles of mastication.

"The conclusions which we draw from anatomy and from experiment are confirmed by the histories of cases in which the fifth nerve had been diseased. In such instances we may observe the most marked separation of the motor and sensitive power, when the larger portion only or the two superior divisions of the nerve are affected, and we find both motion and sensation destroyed when the whole trunk of the nerve is involved in the disease. It is not uncommon in such cases to find the eyeball totally insensible to every kind of stimulus, the nose quite unexcitable by the fumes of ammonia, or the most pungent vapors, and the mucous membrane of the mouth so insensible to the contact of foreign matters that a morsel of food will sometimes remain between the gum and the cheek until it has become decomposed. The insensibility of the eyeball exposes it to the permanent contact of irritating particles of dust, etc., which excite destructive inflammation of its textures. The whiskers may be pulled forcibly without sensation. The muscles of mastication become wasted and inert, as shown by the distinct depression in the regions of the masseter and temporal muscles, but the superficial muscles, on which the play of the features depends, preserve their natural condition.

"The fifth nerve may, therefore, be regarded as the motor nerve in mastication, and the sensitive nerve to that great surface, both internal and external, which belongs to the face and anterior part of the cranium. From its great size, and the large portion of the medulla oblongata with which it is connected, it may excite other nerves which are implanted in that centre near to it. Thus it may be an excitor to the portio dura, as in winking; or to the respiratory nerves, as in dashing cold water in the face, or in sneezing. Its lingual portion distributed to the mucous membrane of the tongue is at once a nerve of taste, touch, and common sensibility, and its connection with the papillary structure of the red parts of the lips constitutes it a pre-eminently sensitive nerve of touch in those regions.

"The study of the pathological conditions of this nerve illustrates its physiology in a highly interesting manner. In the dentition of children, whether primary or secondary, it is always affected, more or less: and in excitable states of the nervous centres, the irritation of it consequent upon the pressure of the teeth often gives rise to convulsions, the brain and spinal cord being irritated; and we can often trace to such irritation, whether in infancy or in childhood, the foundation of epileptic seizures in subsequent years. Painful affections of the face (*neuralgia*) have their seat in this nerve; *tic douloureux*, for example. Many of the instances of painful affection of this nerve or of branches of it, which come under our observation, are well-marked examples of reflected sensation, the

primary irritation being conveyed to the centre by the vagus or the sympathetic from the stomach or intestinal canal. No one of these is so common as the pain over the brow, which so often follows derangement of stomach digestion; and which may frequently be instantaneously removed by taking away the source of irritation, as by neutralizing free acid in the stomach. Frequently also the branches of this nerve, in greater or less number, on one or both sides, may, according to the humoral view, form a focus of attraction for a morbid matter generated in the blood, in persons exposed to the paludal poison, or in persons of rheumatic or gouty constitution; in these cases, as in most others of similar pathology, the neuralgia occurs in paroxysms of greater or less severity, each paroxysm being followed by a period of convalescence, which lasts, it may be supposed, until the morbid matter has been again accumulated in quantity sufficient to induce a high degree of irritation of the nerves."

REMOVAL AND REPLACEMENT OF A NATURAL TOOTH.

BY ED. ORTON PECK.

I NOTICE in the March number of the DENTAL COSMOS a note from the *Lancet*, speaking of a lady who could remove and replace some of her natural teeth from and back to their sockets.

I had a very similar case in my practice, a few years since, which I will relate: Mr. B. called to have me put a tooth on a silver plate. The plate was a clasp plate, and had upon it the four superior incisors and a bicuspid. The clasps were two in number—the left clasp embraced the first molar of that side, and the right clasp embraced the second bicuspid of that side, which was standing alone. The curious part of the affair was, that the clasp on the bicuspid being tight about the tooth, when he took the plate out of his mouth, he took the bicuspid out from its sockets with it, the tooth coming out clean and leaving a clearly-defined cavity just its shape. The depth to which the tooth was imbedded while in place was nearly to its neck, it not being denuded more than two lines of the gums from its normal state. The process was absorbed but very slightly. Mr. B. told me it had been in that condition for some years, and said that when he—as at times he did—left the plate out over night, he found it somewhat difficult to replace it in the morning. I fixed the plate for him, and he wore it in that condition some year and a half longer, when the molar tooth came away, necessitating him to lay the plate one side. The displacement of the tooth was evidently due to the encroachment of a very thin film of tartar, aided by the working of the clasp, caused by the use of the artificial teeth. The molar came away also from the encroachment of tartar, and exostosis caused by hypertrophy; the points of the roots being very much enlarged.

MORRISTOWN, N. J., March 10, 1865.

REGAINING SILVER FROM AMALGAM.

BY J. CARROLL HOUSE, D.D.S.

I AM one of those who occasionally make use of amalgam for plugging carious teeth—perhaps not according to the “fathers” exactly. I put it into just such cavities for my patients as I should select for a brother-dentist to stop with a plastic metallic filling in my own mouth. But it was not to throw down the gauntlet in the amalgam controversy that I took up the pen, but to relate the results of an experiment, for the benefit of “those whom it may concern.”

In the course of ten or a dozen years’ practice there have been accumulating in the drawer of the desk of my laboratory quite a lot of amalgam *debris*: old fillings, fragments remaining after inserting a plug, etc., which had grown to quite a collection, amounting to some fifty pennyweights.

I took a couple of Hessian crucibles, sizes No. 4 and No. 3, and put my amalgam *debris* in the larger one; then carefully chipping off the external of the bottom of No. 3, until I had made a hole through the same about one-fourth of an inch in diameter, I inverted this within the mouth of No. 4, (the mouth of the former slipping a little distance within that of the latter.) Taking a piece of carbonized iron wire No. 20, I formed a loop around the larger crucible, just below its upper edge, and from the centre of each of the three sides of this triangular hoop, I twisted a short piece of the same wire of sufficient length to extend up above the broken bottom of the inverted crucible. These three wires I now twisted together into a sort of knot immediately over the aperture in the crucible No. 3. Moistening some fine clay, I closely luted the space around the mouth of No. 4, thus making the whole tight, except the hole at the top under the knot; the latter affording a convenient means of handling the whole. Having thoroughly dried the luting in the oven of a common stove, I now placed the apparatus, with its contents of amalgam, in my furnace, (a draught one,) and carefully placing the coal around it, slowly started the fire. When, in the course of a few moments, the fire had got well under way, I raised the lid of my furnace, and, lo! a sublime (in a technical sense) sight met my admiring gaze, for the hero of former fiery trials was conquered at last, and, pent up as he was, could only belch forth his spleen in a stream of sublimed mercurial ire, which rose as a vapory column of sacrifice from the funeral pyre of the departing Ichabod.

Closely watching the progress of the experiment, I took the apparatus from the fire the moment the stream of vapor ceased, and, giving it a good shake, set it aside to cool. Upon separating the crucibles, the mass was found a nice solid button in the bottom of No. 4. This was now remelted

in a clean open crucible, adding a little pure *tin* to restore the necessary waste from oxidation, and poured into an ingot for filling. Subsequent use of the resultant has proven it to be in all respects as good as though compounded directly from the *pure metals*.

LOWVILLE, N. Y., February, 1865.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE annual commencement of the Pennsylvania College of Dental Surgery was held at the Musical Fund Hall, Philadelphia, February 25th, 1865.

The valedictory was delivered by E. Wildman, M.D., D.D.S., Professor of Mechanical Dentistry.

The number of matriculants for the session was fifty-seven.

The degree of D.D.S. was conferred on the following gentlemen, by Henry C. Carey, Esq.:—

NAME.	RESIDENCE.	TITLE OF THESIS.
GASPER A. BETANCOURT,	Cuba,	Filling Pulp Cavities and Roots of Teeth.
SAMUEL A. BEECHER,	Missouri,	Sulphuric Ether.
HOWARD BASSETT,	New Jersey,	Diseases Incident to First Dentition.
BENJ. J. BING,	Maryland,	Dentistry, a Science.
J. WESLEY CLEMSON,	Pennsylvania,	Predisposing Causes to Dental Caries.
AUGUST CULMAN, M.D.,	Bavaria,	Neuralgia of the Trigemini.
EDWIN T. DARBY,	New York,	Dentistry, a Profession.
HORACE ENOS,	Pennsylvania,	Vulcanized Rubber.
SIMON FRAU,	Cuba,	Ether.
MICHELE FICHERA,	Sicily,	Filling Teeth.
J. N. FARRAR,	Massachusetts,	Intermittent and Hysterical Neuralgia
SIMON GUILFORD,	Pennsylvania,	Vascularity of Dentine.
JAMES O. A. JOHNSON,	New Jersey,	Extraction of Teeth.
JOHN LYMAN, M.D.,	Ireland,	Military Dentistry.
C. A. MILBANK,	New York,	Diseases attending First Dentition.
CHAS. B. McGRATH,	Pennsylvania,	Hysteria.
WM. A. NEWLAND,	Pennsylvania,	Fractures of the Teeth.
ABRAM PRATT,	Pennsylvania,	Odontology.
S. G. PERRY,	New York,	Inflammation.
P. PRETERRE, M.D.,	New York,	Development of Teeth.
JARED A. PERKINS,	Massachusetts,	Cause of Dental Caries.
THOS. ROBINSON,	Delaware,	Irregularities of the Permanent Teeth.
THOS. ROBSON, Jr.,	Pennsylvania,	Rubber.
HEWLETT C. ROCKWELL,	New York,	Nitrous Oxide.
A. EMORY STREET,	New Jersey,	Entire Artificial Dentures.
W. H. SCHOLL,	Pennsylvania,	Indurated Rubber.
GEO. B. SANDFORD,	New York,	Teeth and their Diseases.
J. B. R. WRIGGINS,	New Jersey,	Caries of the Teeth.
J. A. WOODWARD,	Pennsylvania,	Treatment of Exposed Dental Pulp

The following are the reports of the Demonstrators:—

OPERATIVE DEPARTMENT.

Number of Patients visiting the Clinic	2600
Number for whom the following operations were performed	1487
Gold Fillings	627
Tin “	696
Wood's Metal	9
Hill's Stopping	14
Amalgam	12
Treatment and Filling Pulp Cavities	176
Superficial Caries removed	6
Removal of Salivary Calculi	57
Treatment of Periostitis	28
“ Alveolar Abscess	10
“ Inflammation of the Gums	5
“ Partial Necrosis	15
“ Irregularities	10
Pivot Teeth inserted	2
Extraction of Teeth and Roots	2010
Total	3677

JAMES TRUEMAN, *Demonstrator.*

MECHANICAL DEPARTMENT.

154 Patients were supplied with the following Artificial Dentures:—

Whole Sets of Teeth	31
Full Upper Sets	48
“ Lower Sets	2
“ Upper Set Blocks	1
Partial Upper Sets	76
“ Lower Sets	4
Obturator*	2
Teeth Mounted on Metal Plates	528
“ Hard Rubber Base	1481
Whole Number of Gum Teeth	902
“ “ Plain Teeth	1107
Whole Number of Teeth Mounted	2009

J. M. BARSTOW, *Demonstrator.*

PHILADELPHIA DENTAL COLLEGE.

THE second annual commencement of the Philadelphia Dental College was held at Concert Hall, Philadelphia, March 1st, 1865.

The valedictory was delivered by J. H. McQuillen, D.D.S., Professor of Anatomy, Physiology, and Hygiene.

The number of matriculants for the session was twenty-six.

The degree of D.D.S. was conferred on the following gentlemen, by the President, Rev. Richard Newton, D.D.:—

* These were made for soldiers who lost their teeth and adjacent bones from gunshot wounds.

NAME.	RESIDENCE.	TITLE OF THESIS.
CHARLES BARNES,	New York,	Treatment of Exposed Dental Pulp.
J. H. BORNEMAN,	Pennsylvania,	Dental Caries.
GEORGE BOWERS,	Vermont,	Artificial Dentures.
W. S. ELLIOTT,	New York,	Hyperæsthesia.
ALBERT T. EMERY,	Massachusetts,	Mechanical Dentistry.
BENJAMIN U. GAUNTT,	New Jersey,	Circulation.
J. S. HURLBUT,	Massachusetts,	Dental Manipulations.
JAMES MC MANUS,	Connecticut,	Preservation of the Deciduous Teeth.
T. B. PERPIGNAN,	New York,	Causes and Treatment of Dental Caries.
F. D. PERRY,	Massachusetts,	Absorption.
E. J. ROBERTS,	Maine,	The Fifth Pair of Nerves.
G. O. ROGERS,	New Hampshire,	Anæsthesia.
C. STODDARD SMITH,	Illinois,	Alveolo-dental Periostitis.
EDWARD P. STARBUCK,	Massachusetts,	Odontalgia.
WILLIAM H. WAITE,	England,	Removal of the Teeth.

The following are the reports of the Demonstrators:—

OPERATIVE DEPARTMENT.

Gold Fillings	315
Tin Fillings	467
Amalgam Fillings	77
Oxychloride of Zinc	8
Hill's Stopping	17
Pulps treated	164
Treatment of Periodontitis	15
Treatment of Alveolar Abscess	13
Sets of Teeth scaled	72
Irregularities corrected	6
Pivot Teeth inserted	6
Roots extracted	943
Teeth extracted	1067

Whole number of Operations 3170

R. J. HOFFNER, *Demonstrator.*

MECHANICAL DEPARTMENT.

Whole Sets of Teeth, Vulcanite Base	20
Full Upper Sets, "	47
Full Lower Sets, "	4
Partial Lower Sets, "	3
Full Upper Sets, Gold Base	1
Full Upper Sets, Platina Base	1
Whole Sets, Silver Base	1
Partial Sets, "	3
Non-sectional Blockwork, Upper Sets	2
Full Lower, Cheoplasty	2
Obturators, Vulcanite	3
Teeth Manufactured, Plain	50
" " Carved Blocks, Upper Sets	4
" " " Lower Sets	2
" " Single Gum	35
Silver Plate and Solder made	oz. 3

Whole number of Teeth Mounted 1864

WILLIAM P. HENRY, *Demonstrator.*

BROOKLYN DENTAL ASSOCIATION.

May 11th, 1864.

REPORTED PHONOGRAPHICALLY BY F. M. ODELL.

At a stated meeting of the Brooklyn Dental Association, held at Williamsburg, the subject of discussion being "Six-year Molars," Dr. Fitch said, in filling these teeth I sometimes find them very soft. If they can be saved till the patient reaches the age of eighteen or twenty years, they will most likely be saved for many years. In cleaning and filling the fangs of these teeth, you should be careful to *not* go through the apex of the fang upon the lining membrane. These teeth are not fully developed when the patient reaches six years of age; they are not at that time such perfect teeth as they afterward become. Among the dental profession there is more doubt in reference to preserving these teeth than any others in the mouth.

In reference to the question of saving these teeth, I would say, *save them in every instance*, excepting where you have what is called jimmer-jaw, (a protrusion of the lower jaw beyond the upper,) in which cases I would sometimes extract, in order to reduce the size of the lower jaw. Generally, however, if I find too much projection of the lower jaw I should advocate spreading the upper jaw to throw the teeth out *over* the under teeth. These six-year molar teeth are as important as any we have in the mouth; they are important for speech, for expression, and for mastication. I could not pronounce upon a case unless I should see it. As a general thing, have advocated the destruction and extraction of the pulp, in order to the filling and saving of the tooth. But as the main question of the evening seems to turn upon the point of extraction, I should say, fill them, by all means!

In answer to a question, the doctor said, for filling these teeth I use gold, unless the tooth was very badly decayed, or the patient could not pay for gold, in which case I use Wood's metal; consider it next to gold in point of usefulness. Do not think there would be any advantage in using a temporary filling of tin foil or any other substance; do not think much of temporary fillings; if the tooth is not in a proper condition to fill, treat it and make it so! I do not think a temporary filling at all necessary for the further calcification of the dentine. Would prefer to use a non-conductor directly over the pulp (in cases where temporary fillings are sometimes used) and fill up at once with gold; if you do not compress the gold upon the pulp so as to produce a thermal change, you accomplish all that you could by a temporary filling.

Had a case not long since where the pulp was distinctly visible through the covering of dentine; dressed with creosote alone for a few days, then used something like Hill's stopping directly over the pulp, and filled with

gold, putting in the gold by hand pressure. Bridged over the tender part, making the filling less dense there than as I progressed outward; malleted on to the walls firmly, and finished off nicely, and by this means the filling is made just as good as if it were solid. Where the pulp is taken out, fill the point of the fang with cotton and creosote; pressing out the superabundant creosote, fill the fang with tin foil or gold; the filling must be solid, but in every instance put cotton and creosote into the point of the fang before filling.

In answer to a question, the doctor said, I do not see as the tooth would calcify if the pulp be removed, the amount of nutrition conveyed to it by the periosteum being very small.

Dr. Perine said, if you can control your patient you might fill in this way. I do not agree with Dr. Fitch in the use of gold; am often *obliged* to use other than gold, on account of the time required to put in a gold plug. If the patients would come to us periodically we might safely say that we could save these teeth, but as it is, the case is very different.

Dr. Hurd said, it is sometimes amusing to see how well we do agree when we understand one another. I do not think it right to take the extreme position taken by some of the gentlemen who say they would not extract because they want development. Know of one family where there are five or six sisters who, with one exception, have the jimber-jaw, as mentioned by Dr. Fitch; they are in this respect fully developed; but one of them is *not* fully developed, and *she* is the only good looking one in the family! She is really a handsome woman.

In this matter of extraction of these teeth, each man should simply use his own judgment.

Dr. Fitch said, believe there is something in *harmonious* development; what a dentist should advocate is harmonious development. After a jaw is fully developed it would be very hard work to undevelop it.

Dr. Frank Abbott asked Dr. Hurd if he would extract the six-year molar any sooner because of the jimber-jaw. Adding, that when the six-year molar is extracted the twelve-year molar is apt to tip forward, and the food is not masticated, but simply cut.

Dr. H. said, I would not extract these teeth any sooner than any others; and if there is any preference, would give it to these teeth.

Dr. Abbott resumed, I understand the word *never* to mean as a general rule. If I could not, or if the patient could not afford to have it filled with gold, would not extract, but would fill with something! If could not afford to fill at all, would kill the nerve if necessary and let the tooth remain! Would not extract.

Dr. Atkinson said, it is a pleasant thing to be consistent; Dr. Fitch says he would extract if they were very much decayed for the cure of jimber-jaw.

Dr. Fitch corrected by saying that he meant to say that for the arrest of jimmer-jaw he would sometimes extract these teeth—whether decayed or sound—by choice.

Dr. Atkinson then related the case of a little girl who had been burned or scalded, and owing to neglect in the dressings, the cicatrix had caused the neck and under jaw to unite; holding the lower jaw down upon the breast, and thereby inducing a very aggravated case of elongation of the lower jaw. The surgeon cured the girl by cutting out the two bicuspid teeth on each side, together with the portion of jaw, down to the margin of the jaw-bone, leaving only a thin plate of the latter remaining; then brought the chin up, so that the incisors could just strike, and it was a complete cure. He charged the pitiful sum of \$400 for the operation, and the father refused to pay it, (although he was wealthy,) saying that he should suppose the reputation gained by the operation was quite sufficient pay. He was sued by the surgeon, and compelled to pay, however. The young lady who is now sixteen or eighteen years of age, has recovered most of her good looks, and presents quite a natural appearance. In relation to the propriety of extracting the six-year molars, would say, we should be governed by the type. If we know what the type is, we say this is complete, or this is incomplete, and should adapt our means to the ends we have in view. I believe this Association, as a body, would vote to save all the teeth that could be saved and made useful to the patient.

Dr. Fitch said, I have taken the extreme ground, because the six-year molar has been made the scape-goat! In reference to poor patients, would do what I considered to be my duty.

Dr. Schæffer said, had a servant girl apply to me only a day or two ago to have the six-year molar extracted; felt as though the members of this Association were looking right at me! She was poor; could not afford to have it filled, and I could not afford to fill it for nothing, and so extracted it! If any dentist would volunteer to attend to this class of patients gratis, I will gladly send them all mine. I have a family depending upon me, and cannot afford to do it.

Dr. Marvin said, had a little girl come in yesterday; tried to have her let me save her tooth; made an application of creosote and arsenic, and let her go, telling her of the necessity of saving it, etc. I killed the nerve and let her take her choice about having it filled, etc.; considered that I have done my duty toward her, and that unless she returns to have it filled, I have no further responsibility in the matter. One of my former patients, a lady from one of the richest families in Brooklyn, came to me to have a tooth extracted, saying she would not be bothered with it any more. I refused to extract it in violation of my conscience and better judgment, and the result was she went off mad, and remains so to this day, for all I know or care!

To the resolution, as it was first offered, I was opposed; but after hearing it explained, and especially after hearing the paper read on the subject by the mover, I should have voted for it with those amendments. Nevertheless, I believe in having our language express just what we do mean! Dentists must use their judgment in every operation that is presented for them to perform. The true method is not to lay down a rule for operations, but to elevate the standard of dental education. One point I think of that is of the first importance; the dentist should make it his business to come into communication with the parents of his little patients. It is the dentist's duty to instruct the parents in relation to their children's teeth, and they should let the children come to him occasionally to have the teeth examined.

Dr. Fitch said that he thought a rule in this case was excusable, because of the onslaught made upon these teeth by dentists generally; and that as every rule has its exceptions, this would be no exception to the general law.

NEW YORK SOCIETY OF DENTAL SURGEONS.

May 18th, 1864.

REPORTED PHONOGRAPHICALLY BY F. M. ODELL.

Subject—FACIAL NEURALGIA—(continued.)

At the meeting of the Society of Dental Surgeons, held at the Cooper Institute this evening, papers were read on the subject by Drs. John Allen and Fitch, after which Dr. Atkinson said, we need no better test than the papers read here to-night, to prove just what our President said, viz.: "We know so very *little* upon this subject!" We are all at sea about neuralgia; are not much elevated above simple empiricism in the treatment of this disease. One criticism with regard to our medical nomenclature, "irritation, inflammation, and suppuration," is the beautiful (?) correlation of terms to which we have listened to-night in the paper read by Dr. Allen. It is not perhaps a shame to be imputed to us for knowing so little; the shame is to be satisfied with imperfect states of knowledge. It is beautiful to study the structure of the teeth, and the order of the deposits of dentine and enamel. What hope have we, if we live in the position in which Dr. Allen has unfortunately placed us? We might agree in our testimony before a court, and we might not; but we should most likely present no case before a jury which a smart lawyer would not rip all to pieces. Irritation is the first inception of inflammatory action; then we have an arrest of the onward movement of the blood in the capillaries, which is the second stage, or the so-called *stasis*. In the third stage we have *congestion*, or a choking up of the blood, etc. Up to this point we need not fear that any mischief has been produced. Then, as a continuation, we have "exudation," and finally solution, resulting in reorgan-

ization or suppuration, or we may sometimes have an arrest of the disease. The exudation is at first fluid, but this soon hardens and produces swelling. Now we may have either one of two actions: the first, resolution; the other, suppuration.

SUSQUEHANNA DENTAL ASSOCIATION.

THE above named Association met at Lewisburg, Pa., Wednesday, January 11th, 1865, at the Hall of the University of Lewisburg; the President, Dr. J. M. Barrett, in the chair.

Members present: Drs. John Locke, R. E. Burlan, G. W. Renn, C. S. Beck, H. Gerhart, J. D. Wingate, C. C. Hower, J. L. Andrews, and W. F. Vallerchamp.

Ballots were taken in the cases of Drs. E. D. Williams, James W. Kesler, George L. Fisher, L. Essiah, Perry Newell, and H. C. Sticker, who were elected active members. Dr. Jas. W. Kesler was appointed reporter for the session.

The following gentlemen were elected honorary members of the Association, viz.: J. H. McQuillen, D.D.S., Prof. J. D. White, W. A. Duff, and J. R. Rubencame, of Philadelphia.

Dr. Daniel Locke, of Oregon, was elected corresponding member of the Association.

The president read an essay, subject, "Errors of the Profession," from Dr. M. D. L. Dodson, who was not able to be present.

Essay, subject, "Preservation of Deciduous Teeth," was read by Dr. C. S. Beck.

Discussions were had upon the essays read, and other professional subjects.

The Convention was a pleasant one, and the members seemed to enjoy the occasion exceedingly.

Adjourned, to meet at Wilkesbarre, Pa., July 12th, 1865.

LOUISVILLE DENTAL ASSOCIATION.

AT the last regular meeting of the Louisville Dental Association, the following preamble and resolution was adopted, and its publication in the DENTAL COSMOS requested.

WHEREAS, a difference of opinion exists with the Louisville Dental Association as to the utility of lancing the gums preparatory to extracting teeth, and also as to the use of water after the operation: therefore

Resolved, That dental societies and practitioners in other cities and localities be requested to report their practice, in these particulars, and societies their debates on the subject, through the DENTAL COSMOS, Dental Register, or other dental journals, or to this Society direct.

CHAS. E. DUNN,
Corresponding Secretary.

EDITORIAL.

DENTAL PATENTS.

THIS subject seems again to engage the attention of the dental profession; a number of years since it was very fully discussed by many able members of our art, but mainly, at that time, as to the right of dentists to patent at all, or as to whether it was in conformity with proper dental ethics. Now another step has been taken, and that is, to contest by law the validity of patent claims which are attempted to be thrust upon the profession. We have not yet been able to see the wisdom of this procedure: first, because it brings one class of men in legal conflict with another; and, second, because it presupposes that no one has a right to letters-patent which his Government may see proper to confer upon him. The first would involve in endless litigation those who contested that right which the laws of the country allowed; and the second, that any one applying for a patent must first obtain a legal opinion as to his right to his patent before he obtains it, or be exposed to attack by those who may think proper to contest it or differ with him, and expose him to unnecessary expense and trouble to defend what he supposed the laws of the country gave him a right to enjoy. As long as the profession of dentistry is composed of a body of men who take different views, so long much trouble and bitter conflicts will arise; and as long as there are many things in dentistry which have been the subject of patents, and many more may occur, we can see *no* end to litigation, or professional strife.

The patent laws of the country are doubtless the stimulus to invention, advancement, and improvement in the mechanic arts in every direction, as well as in dentistry. If it be wrong to patent anything in dentistry, apply for an alteration of the laws. The man who holds letters-patent, granted by the laws of his country, has decidedly the advantage of any combination which can be brought against him. And yet those members of the profession who can afford to give the fruits of their labor and inventions to the body of the profession, free of pecuniary reward from their brethren, or if they be actuated by an *esprit de corps*, they should not object to those who cannot afford to act from such high and noble impulses.

We would suggest that a different course be pursued; let the profession be divided into two distinct branches. Let every one who invents, or thinks he has improved, any mechanical thing, or material, or appliance, have the right which the laws of his country guarantee to him; but he who thinks differently let him set himself aside from association with him, as a true professional man, and let the patentee in turn be satisfied with whatever emolument may accrue to him by the sale of his wares or improvements to whomsoever may choose to purchase them, and use them in his practice, by paying a remunerating price, without the necessity of purchasing

the right also to use what he has purchased, as his wants or occasion may require. Is it not enough to sell the article, whatever it may be, for what it is worth, if it be better than that which has not been patented, without the purchase of the *right to use* what one buys and pays for? Besides, there is another grave and important question involved in this matter; we feel that we have a right, nay, it is our duty, to express opinion with reference to the merits or demerits of an article offered to the profession by patentees; and yet it does not accord with the overweening aspiration of a patentee. We are rendering ourselves amenable to prosecution by law for daring to express opinions which may militate against what he regards as his lawful rights. If patentees are allowed to thrust articles upon the profession, which are intended to be employed for the alleviation of human suffering, and the opinion of one or another may differ, and the fear of prosecution is to shut his mouth so that it is passed over in silence, and forced upon the inexperienced, then it is high time that patents should cease to be granted for any purpose, except for the merest mechanical and mercantile purposes. Who would think of purchasing a license to use a patent plow, or thrashing machine, or washing machine? Why, he would call down upon him the laugh from every washerwoman or plowman. Every one has a right to patent, but not to restrain opinion or criticism with reference to its utility in the community he lives in.

J. D. W.

OBITUARY.

DR. E. W. HADLEY, President of the Chicago Dental Society, departed this life, March 4th, 1865, after a sickness of but five days. He was the oldest practitioner in Chicago, having located here about twenty-five years ago. He was the first president of the Chicago Dental Society, which office he held at the time of his death.

"At a meeting of the Society, on Monday evening, March 6th, 1865, Drs. Ellis and Cushing, from a select committee, reported the following resolutions, which, after appropriate remarks by Drs. Ellis, Freeman, and Cushing, were adopted, and ordered placed upon the records:—

"WHEREAS, by the providence of the Supreme Ruler of the universe, who controls all human destiny, and doeth all things for good, we have had suddenly taken from our midst our worthy and much loved President, Dr. E. W. Hadley: therefore be it

"*Resolved*, That while we reverently bow with chastened submission to the high and imperative mandate of our heavenly Father, we will endeavor to derive solace and consolation from the hopeful assurance that his appointed pilgrimage is completed, and that he is only called from earth to partake of the heavenly banquet, in the presence of God forever.

"*Resolved*, That his unwavering integrity and unaffected urbanity of character, and his devotion to this Society, and the profession of which he was a highly respected member, his charity toward his professional brethren, his indulgent and affectionate solicitude as a husband, parent,

and friend, constitute a cluster of virtues worthy the admiration and emulation of all who aspire to be good.

"*Resolved*, That as a Society we will gratefully cherish the memory of him whose death we now deplore, and, as sincere mourners, extend our fraternal condolence to his bereaved family, fervently hoping that their sorrows may be lightened and their grief assuaged, by commending them to the sovereign care and infinite mercy of Him who gave, and who has taken away."

Voted that the members of the Society, and of the profession in the city, be invited to attend the funeral in a body, to assemble at S. S. White's Dental Depot one hour in advance of the time of the funeral.

J. W. E.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

CONTINUANCE OF THE HEART'S ACTION AFTER DEATH.—Although it is a well-recognized fact, substantiated by numerous observers, that the heart of cold-blooded animals will continue to pulsate for hours after death, the manifestation of analogous phenomena on the part of warm-blooded animals has apparently not attracted much attention; at least I am not acquainted with any case on record in which the alternate contraction and relaxation of the heart is described as continuing for the length of time after death noted by me in the following instance:—

With the view of demonstrating the *diastole*, *systole*, and *tilting* of the heart, to the students of the Philadelphia Dental College, in accordance with my usual practice, I had recourse during the past session to *vivisections*. In place, however, of frogs, usually employed by me heretofore, and which, owing to the snow and ice, were inaccessible at the time, rabbits were used for the purpose.

To remove all objections to the vivisection on the score of cruelty, the animals were first rendered insensible by the inhalation of chloroform; an incision was then made through the integuments of the neck, so as to expose the trachea, which was carefully opened a short distance below the larynx, and the nozzle of a mouth-blowpipe introduced, with the view of maintaining artificial respiration. The cavity of the chest was now opened by a longitudinal incision made in the median line, through the integuments, down to the *sternum*, which was readily cut through with a pair of shears; the two sides of the chest were then drawn widely apart, so as to expose the heart and lungs. To do this fully, the pleura and pericardium had to be slit up, and their attachments carefully dissected away; while this was being done, insufflation of the lungs was effected by an assistant, Dr. G. O. Rogers.

Artificial respiration was thus maintained for about thirty minutes.

When first exposed, the movements of the heart were so rapid that it was exceedingly difficult to determine which period corresponded with the *diastole* and which with the *systole* of the organ; as the frequency of the pulsations gradually diminished, however, the distinction became quite apparent. The *tilting* of the heart was also markedly manifest, and its *correspondence* or *dependence* upon the *systole* of the *ventricles* was very evident.

The phenomena thus presented not only continued during the period in which insufflation was kept up, but for *two hours and a half after that had ceased*. This fact was observed by a large number of the class as well as by me. The contraction and dilatation became less and less frequent after the suspension of artificial respiration, and toward the close an interval of a minute or more would elapse without any perceptible motion, and this, when occurring, being confined at last to the auricles alone. Eventually it ceased altogether.

The length of time during which the action of the heart continued in this case was of course limited in comparison with that of cold-blooded animals. In frogs, for instance, I have observed frequently the pulsations for five or six hours after the organ had been removed from the body. And on one occasion the heart of a decapitated frog, exposed by me in the presence of Dr. Garretson and a few other friends, continued in action for a period of fifteen hours. No opportunity has been afforded me of observing the motion of the sturgeon's heart, which, according to Drs. Mitchell, Dunglison, and Smith, has pulsed for over twenty-four hours after death.

The practical application to be made of the case of the warm-blooded animal is, that in instances of apparent death from anæsthesia, drowning, etc., of human beings, the efforts directed toward the restoration of suspended animation should be continued beyond the time usually employed; for it is reasonable to infer, if the action of the heart continues for this length of time in the lower warm-blooded animals, it is very possible that the same thing may occasionally occur in man, and that under such circumstances, hoping against hope, resuscitation may be accomplished when there was little or no prospect of such a favorable result being obtained.

BRITISH JOURNAL OF DENTAL SCIENCE—DECEMBER.

"ODONTOLOGICAL SOCIETY—(*Continued from page 454.*)—MR. MASON.—As one of Mr. Fergusson's colleagues at the hospital, I have had extensive opportunities of seeing this operation, and of judging of its results. I have also been privileged for several years to assist him in private practice, and can therefore speak, with confidence, to the success, so far as the immediate operation is concerned, and to the subsequent improvement in the voice. It is quite true, as Mr. Pollock has already remarked, that many cases are not so satisfactory as one could wish. There are, however, other cases which give us almost all that can be desired,

and, though the voice may be but slightly improved, I think the success is sufficient to justify the performance of the operation. It appears to me that the presence of an artificial velum, such as Dr. Kingsley has shown, must be extremely cumbersome and disagreeable to the patient. Mr. Pollock has adverted to the fact that pieces may come off, and fall down the larynx. I wish to ask Dr. Kingsley the precise mode in which this instrument is fixed; for, as I understand him, a piece of silk attached to a tooth was all that was required. This seems to me a very imperfect mode of fastening, and insufficient to prevent the instrument from accidentally falling back into the pharynx. With respect to the success of the operation, I wish to ask Dr. Kingsley the exact number of cases he has seen, so that we may know the proportion of successful cases, as well as the failures; for it is only by taking the aggregate of cases that we can get at practically useful results. Dr. Kingsley, I apprehend, speaks of the operation as performed in America. Mr. Fergusson's experience in this matter is as well known to all present as it is to myself; and I can vouch for the ultimate result in many of his cases being most satisfactory. Mr. Pollock has told us that in many of the cases upon which he has operated, he has had reason to be satisfied, so that I can hardly imagine that this instrument, ingenious as it is, will supersede the operation which leaves the patient unfettered and perfectly independent of all mechanical art.

"Dr. KINGSLEY.—I have not made a note of all the questions that have been proposed, and I dare say I shall not be able to answer all; besides, they open up a field that would take us hours to discuss thoroughly. I did not intend to present this subject in any such way that it should excite any rivalry between different instruments; it was only to discuss those principles which lie at the foundation of all treatment; and I had no disposition whatever, to present an instrument as *my* instrument, as opposed to anybody else's. (Hear, hear.) Mr. Mason asked me for some statistics; I have no figures with me as to the number of cases that are unsuccessful in America, but I have the testimony of Dr. Valentine Mott, who stands at the head of American surgery, of Drs. Carnochan, Willard Parker, Post, Buck, Van Buren, Agnew, and many others, professors of surgery in the medical colleges of America; showing that they have abandoned the operation of staphyloraphy in a great majority of cases, because they failed so commonly in getting such satisfactory union of the parts as to justify the operation. Perhaps I ought to say in explanation of that matter that our country is totally unlike yours in one respect; we have half a dozen cities, with a population of from 200,000 to 300,000 inhabitants, scattered over a settled country extending more than a thousand miles, and each of these cities is a centre for its population around. Each of these cities, with many smaller ones, has its medical and surgical college, to which patients for operation in that vicinity would naturally repair. With you the large number of cases who require operations come to London. Therefore, they are concentrated, and they would get naturally into a few hands. Ours are scattered over the whole country; so that it is not so possible for any one man who might make this a specialty to have the number of cases that either Mr. Fergusson or Mr. Pollock has had; and as a necessary result it is not possible for them to acquire that skill in operating which these gentlemen have acquired. I must claim for them, however, that they have equal skill of hand, and equal delicacy of manipulation, naturally;

but, for all that, the larger experience gives the greater skill. I am sure that the success which has attended the practice of Messrs. Fergusson and Pollock is as much due to their continued experience as to anything else. I am asked as to whether the artificial velum would slip down the throat. In the paper I have read, I explained that it is kept by a simple attachment of gold. It is self-supporting because it rests on the top of the bone at the apex of the fissure. Any simple attachment will keep it from slipping down; a string would hold it, but I prefer a little branch of gold that shall reach forward and embrace one or two teeth. With regard to Mr. Pollock's question about pieces of the velum coming off, I have seen these worn for a long time without their becoming so disorganized that they came to pieces. I think that is perhaps as much attributable to the composition as to anything else. The preparation of this rubber is a combination that has been made expressly for this purpose. I do not pretend to say it is unlike any other preparation of rubber ever made for any purpose; I only say it is something made peculiarly and expressly for this purpose, and that I am not aware of the same composition ever having been used for anything else. It is far more durable than common sheet rubber sold in the shops. I am sorry that the discussion should have taken the shape at all of any kind of contrast made between one instrument and another. There is an abundance of testimony that Mr. Sercombe's instrument has accomplished great good. He states that: that is enough. I do not know anything about it, except his own statement, that is enough for me—I believe it; he would not come here and state it unless it were so. At the same time, I think that the principle (now that the question of comparison between instruments has been brought up) upon which mine is adopted is such that it will produce more uniform and perfect results through entire time. As I understand Mr. Sercombe's appliance, it is a curtain of common sheet rubber, which hangs on the anterior surface of the velum, which it bridges across. It seems to me that, accepting his own statement in regard to the destructibility of his material, it must in a very short time begin to droop. If my principle is right for the treatment of cleft palate by mechanical means, then there must be at that time a little difference in the speech from what there would at other times. When it droops away, it is not so good as I conceive is essential for perfect articulation. It may do much good, but I want it to go further than that. It seems to me essential for the perfection of articulation that there should be an instrument which would be kept by those parts in its place, so that even if the material itself was inclined to yield and give way, the whole thing would be supported—mine reaches behind the fissure, and is sustained by the remnant of the velum even after the material is said to have become weakened, and in that way it is kept from drooping, so that the voice will not be permitted to escape behind it. Some other matters were brought up for discussion, which the President ruled were not strictly connected with the paper: one was as to the treatment caused by disease. I may be allowed one remark in reply, and it is this: it is a very singular fact, but nevertheless true, that when a patient has once acquired the power of articulation, he may lose certain organs that seem to be essential to that acquirement, and he may overcome that loss by very simple mechanical means. I was conversing in a private way with Professor Dunglison, of Philadelphia, a physiologist of world-wide reputation, on this subject; I said, my theory in regard to this principle is at fault, when I come to apply it to lesions or fissures in the soft palate induced by accident or disease; I cannot see why it should not

apply equally well to those cases. His reply was: 'Your theory is perfectly correct in its application to congenital cases.' And then he explained to me, in a way that I have neither time nor memory to repeat, why it was that in those cases where the power of articulation had once existed perfectly, and the parts were lost, it might be restored again without any comparative restoration of the parts, the remaining organs, in connection with the cultivated ear, making up by the task imposed upon them in a measure for the loss. It is also a fact that the soft palate may be eaten away, somewhat similar in form to a congenital fissure, and the posterior nares plugged to a certain extent with an obturator, and good articulation follow; but the same result is not obtained when it is applied to a congenital case. I have seen cases over and over again where cotton has been tucked into the cavity, and the speech was so good that a practiced ear would only say the person had a little cold in the head. It was therefore I confined my paper exclusively to the treatment of congenital fissure, and I do not wish it to be understood that any remarks that may apply to other kinds of fissure apply in any way whatsoever to the treatment of congenital cases. Mr. Sercombe's cases, which have been referred to, of the application of his instrument to syphilitic or accidental fissure, and their excellent results prove nothing whatsoever as applied to congenital cases. Congenital fissure requires a great deal more care and skill to give the patient success in the power of articulating. In regard to retching, I have been surprised at my own experience. I expected, in my first case, to have great trouble in getting my patient to wear these appliances, and it was with some fear and trembling that I introduced the first instrument into its place, hardly knowing what the result would be. I could not see its posterior edge when the mouth was simply opened. But it was worn from that time without discomfort, and I do not remember ever seeing any retching when introduced, or of its causing any subsequently; but let me not be understood as saying there *never* was any; if any, it was so slight as to have passed away immediately. Mr. Sercombe referred to Stearns' instrument, and compared it with mine. I believe to him, Stearns, is due the credit of having first accomplished great results in the wearing of an artificial velum. There is no doubt but *that* credit is fully due to him; but his instrument was a formidable piece of mechanism, and the most that can now be said of it was that it proved it could be worn in its place with comfort, and made such use of, that perfect articulation would follow. That is a great deal. It was formidable, complex, liable to get out of order; it was arranged with gold springs, which were necessary to its perfection—that is to its use, and the result was, as I have heard Mr. Stearns say, that it could not be adapted to a child. It could not be adapted to any one except a person of maturer years who would handle it with care, as it was liable to get out of order if it were not carefully handled; but when it was kept in order it enabled him to accomplish great results. While I believe my own instrument possesses all the merits Mr. Stearns' instrument ever did, it possesses, I think, this additional one, that I can handle it with entire freedom, or do anything I choose, and it is just as good as it was before; it instantly returns to its place, and as I have remarked in the paper, it is so simple that a child cannot injure it or handle it to its detriment.

"The PRESIDENT—I regret very much that the evening has passed away so quickly. We should like to have asked Dr. Kingsley to describe his process of getting the model of the soft parts. I think he spoke of taking his model with plaster of Paris. That, I must confess, to English

throats, would be an exceedingly irritating proceeding, and we should have liked to have some more light thrown upon it. With respect to the apparatus which has been brought before us, I am sure we must give Dr. Kingsley credit for having produced a very perfect instrument; and, no doubt, the most perfect instrument is to be commended; but at the same time we should endeavor to make our patients as independent as possible, and should strive to make these things economical. They should be inexpensive, but they should be, above all things, not liable to derangement. In some cases that I treated a few years ago, I used, first of all, the vulcanized velum, and replaced that, afterward, with a very simple form of gold velum. With respect to Mr. Stearns' instrument, I had an opportunity of watching its behavior, and have no hesitation in saying that his certainly was the most perfect instrument, though, as Dr. Kingsley has said, somewhat complicated. But, with all the care he could give to it, he found it did undergo those changes which vulcanized India-rubber, according to our experience, does undergo sooner or later, especially when subjected to a continued high temperature. He found that, with the greatest care, it still lost its elasticity in a short time, and therefore it was, that he put in the delicate gold springs to which Dr. Kingsley has referred. This was done to maintain the elasticity which was not maintained in the vulcanized gum. When his apparatus was newly made he could subject it to pressure, and it would regain its form, and we know newly-vulcanized India-rubber will do that; but the question comes, whether, after six months, twelve months, or three years wear, it will still exhibit those characteristics. I have constantly found that with the vulcanized India-rubber most carefully prepared, it has still undergone these changes; and, therefore, for a long time past I have replaced all those that were made upon that principle with collapsible gold vela.* For those cases in which the fissure is large and the parts scanty, this is the simple form—concave from above downward, and from side to side, which I usually adopt, and where it is desirable to insert it within the fissure, this, which will collapse laterally, as in the act of deglutition, besides moving freely back and forward. I have replaced all those with gold vela, and I find that the gold is well tolerated after wearing India-rubber. The movements required in the velum are really reducible to two, the backward and forward motion, and the lateral contraction, which are provided for in this apparatus, and the elasticity of each of these can be graduated to the muscularity that is to act against it. I am still very much puzzled to understand Dr. Kingsley's good fortune in meeting with no retching on the first introduction of his apparatus. My experience in the treatment of these cases is directly contrary. I have been content with a good model of the hard palate and upper portion of the velum pendulum palati; and I then take measurements of the rest; I also begin with a shorter velum than is eventually necessary to make a perfect instrument, but still there is a violent effort to reject it at first, and this is only to be overcome by gargling the throat with iced water, and using the instrument for short periods daily until it can be tolerated. Of course this varies in different cases. It is not so in all, but I should say that in my experience it is a rare exception if there is not some retching on the first introduction of the instrument. So that I cannot help suspecting that there must be something in the American temperament which is favorable to the toleration of these things. With respect to the operation

* Specimens of this apparatus were exhibited.

of staphyloraphy, Mr. Pollock has ably stated his objections to it, but, at the same time, bearing in mind that where the parts are plentifully produced, and promise a fair amount of success, it renders the patient so much more independent, that I should still be inclined to recommend it. The late Mr. Avery performed some admirable operations, both on the hard and soft palate. I saw one in which he had operated fifteen times, and ultimately with great success; but it requires a rare patience to accomplish such results. I feel our time has expired, and therefore, although there are many things that might have interested us very much, and that we should like to hear more about, I must draw these remarks to a conclusion."

LONDON DENTAL REVIEW—OCTOBER.

"**PLATINA FOIL FOR STOPPING TEETH.**—The want of a good substitute for gold foil in stopping teeth has long been felt by many members of the Dental Profession. The only material hitherto suggested has been tin foil, which has always appeared highly objectionable on account of the large proportion of lead which is unavoidably present. We were, therefore, glad to find at the National Dental Hospital a sample of platinum foil sent by Mr. Pratt, of Broad Street. Mr. Hulme, one of the Dental Officers, has tested this material in several cases at the hospital, and so far as that gentleman's experience has gone, he reports very favorably of its use. It is soft, packs well into the cavity, and makes a very durable stopping that will not be discolored by the fluids of the mouth. The first question to be decided in all such matters is the purity of the metal, and Mr. Hulme, therefore, requested his colleague, Mr. Tribe, the Lecturer on Metallurgy at the Metropolitan School of Dental Science, to test the quality of the foil that had been received from Mr. Pratt. Mr. Tribe's report is satisfactory. He says, 'I have examined the foil you sent me, and find it to be a good sample of commercial platinum.' We believe the foil will prove a valuable addition to our present list of stopping materials. Under any circumstances, it must be far superior to tin foil, while its lower price will render it available in a large number of cases where gold would be too costly."

DENTAL REGISTER OF THE WEST—JANUARY.

"**KEROSENE FOR HEAT IN VULCANIZING, ETC.** By T. B. WELCH. For the last six months I have been using kerosene for vulcanizing, etc. Thinking that a description of my apparatus may be of service, I give it to the profession.

"It consists of an ordinary size kerosene hanging lamp, with a good size burner; a sheet-iron sheath for holding the vulcanizer, with a sheet-iron chimney attached.

"This sheath is one and a half inches in diameter larger than the boiler, and stands upon three legs supporting it over the cone of the lamp, the hole in the bottom of the sheath just fitting the cone around the blaze. The bottom of the vulcanizer is brought to within one inch of the lamp cone. The sheath is of two parts: the upper two-thirds made to fit on to other third; put together when vulcanizing, taken apart when melting wax, etc. The chimney is two inches in diameter at the place of attachment at the lower part of the sheath. An elbow extending back one and a half inches from the sheath carries up the tapering chimney fifteen inches, with the top three-quarters of an inch in diameter. A little glass window in front gives a good sight of the blaze.

"The kerosene burns as free from smoke as in the ordinary glass chimneys. The heat is much easier controlled than with alcohol, and of course much cheaper."

LONDON DENTAL REVIEW—JANUARY.

"ON FLAME—(*Continued from page 456.*)—We have seen that gases differ in their combustibility. Some, as we found, require a white heat, while others require a red heat only, to induce them to burn or to undergo combustion. A similar property, be it observed, is attached to combustible vapors and to solids and liquids employed for illuminating purposes. But for such solids to inflame, they must first be liquefied before it is possible for them to become vaporized or decomposed into gases; and as heat is necessary to cause this change of state, it follows that the combustibility of these solid bodies decreases somewhat in proportion to the increase of heat which is required to melt them—*e.g.* it has been found that paraffine, which melts at $54^{\circ} 4$ C., burns, when made into candles, at the rate of 122 grains per hour; spermaceti, which melts at $48^{\circ} 8$ C., burns at the rate of 132 grains per hour; and composite, which melts at $46^{\circ} 1$ C., burns at the rate of 144 grains per hour. Liquid oils, of course, are in the same physical condition as melted fats, etc., but combustible liquids, which are capable of being vaporized without decomposition, decrease in power of combustion proportionately to the increase of heat required for their boiling points—*e.g.* ether boils at $35^{\circ} 5$ C., and inflames when a lighted taper or other source of heat is held some distance from the liquid. Alcohol boils at $78^{\circ} 4$ C., and, as a consequence, its vapor mingles with the atmosphere much more slowly than that of ether, and, being less inflammable, does not burn so rapidly. The burning oils boil at a comparatively high temperature, and, as they do not mingle with the atmosphere at a common temperature, they cannot be kindled by simply placing a flame in contact with them, as in the case of alcohol and ether; it is necessary, therefore, when kindling oils, either to spread them over a larger surface, or to employ a wick to carry them in small quantities to the source of heat.

"The composition of the preceding substances, as well as of all artificial flame materials, consists of carbon and hydrogen, with a comparatively small proportion of oxygen. The carbon, owing to its fixedness at high temperatures, acts as the light-giver to the flame; the hydrogen, owing to its gaseous nature and to the facility with which it becomes incandescent in the atmosphere, acts as the flame-producer, whereas the oxygen is an unnecessary ingredient; for whatever the carbon and hydrogen may require for combustion can be obtained from the atmosphere: and it may also be observed, that oxygen is not only an unnecessary, but absolutely an injurious element, as it consumes both carbon and hydrogen before they have time to perform their allotted work. In proof of this latter statement, we point to the amount and to the brilliancy of the light emitted by the combustion of pure hydro-carbon—*e.g.* paraffine oil gives more light, weight for weight, than any of the oils which contain oxygen; and as to the light-giving power of solid paraffine, we draw attention to the following results obtained by Dr. Letheby. He states that the light produced by 98 lbs. of paraffine candles is equal to that of 120 lbs. of spermaceti, or 138 lbs. of wax, or 144 lbs. stearic, or 155 lbs. of the best composite candles; or, weight for weight, the illuminating power of paraffine is rather more than 22 per cent. greater than that of spermaceti, about 40 per cent. greater than that of wax, 46 per cent. greater than stearic, and

58 per cent. greater than composite. And the reason for this difference in illuminating power is due, principally, to the absence of oxygen of paraffine, and its presence, in various proportions, in the other named bodies.

"The hydro-carbons best adapted for artificial light have the general formula C_nH_n , that is, carbon in the proportion of one atom (12 parts by weight) to two atoms of hydrogen (2 parts by weight)—*e.g.* paraffine and olefiant gas, the two most valuable illuminants, contain carbon and hydrogen in this ratio, as also do the majority of burning oils and solid fats. It must, however, be remarked that in all these bodies the carbon and hydrogen are in what is termed *chemical* union, and it is only when these elements become dissociated by the analytical action of heat that light is emitted. How and when this separation occurs may, perhaps, be best explained by tracing the successive action of heat during the establishment of a candle flame.

"To 'light a candle,' a flame or other intense source of heat is usually placed in contact with its wick. The first change observed is the melting of a small quantity of the substance of which the candle happens to be made; the second, the ascension in the wick, by capillary attraction, of a portion of this melted matter, which, as soon as it comes in contact with the heat, is partly vaporized, partly decomposed into gaseous hydro-carbons, and, finally, these suffer a further change, which ends in the dissociation of their elements, the production of flame by the ignition of hydrogen, which, by heating the carbon, which has separated in a very finely-divided condition, produces light. The vapor is found in the dark central cone. At the base is observed a dark, *faintly blue* portion, bordered on either side by a brighter, but lighter blue line: here a small part of the vapor undergoes complete combustion, which, by greatly augmenting the heat, resolves a larger portion into its elements, carbon and hydrogen, the latter of which inflames and heats the carbon to vivid incandescence: thus the light-giving part is produced. Surrounding this part an almost non-luminous covering may be observed: here, whatever little escapes combustion is, or ought to be, completely burned. As the candle burns, these various beautiful processes repeat themselves, the heat necessary to continue the process being derived from the combustion in progress. The quantity of the products of combustion of hydro-carbon differs, of course, in proportion to their purity; but, during the combustion of 14 parts by weight of a hydro-carbon of the formula C_nH_n , 48 parts of oxygen are abstracted from the air, which at the same time receives 44 parts of carbonic acid gas and 18 parts of watery vapor. The well-known deleterious effects of this carbonic gas renders good ventilation necessary where gas or other hydro-carbon flames are burning.

"Flame is not only of value as an illuminant, but as an auxiliary to oxidation in many metallurgic processes, as well as in many of the useful arts—*e.g.* to separate lead from sulphur in the native ore, galena, it is necessary, in the first stage of the process, to cause the sulphur and lead of a portion of galena to unite with oxygen, which is done by allowing coal-flame, in presence of air, to impinge upon the crushed ore, which is usually placed on the hearth of a reverberating furnace. It is well known that metallic lead may be exposed to atmospheric influence without oxidizing to any great extent, but when exposed to the action of flame in presence of air it is rapidly converted into the common oxide of lead, litharge.

"Again, white arsenic and sulphurous acid are, on a large scale, prepared by submitting arsenical and iron pyrites to flame in presence of air: should the quantity of air be only sufficient for the combustion of flame, its functions become at once reversed; it no longer possesses oxidizing properties, but has the power to reduce many compounds, especially oxides, to the metallic state. The reason for this will not be difficult to understand, if we remember the great reducing properties of incandescent carbon and hydrogen. * * * *

"Although, as already noticed, flame possesses a very high degree of heat, it is often necessary to augment its temperature; and this can only be done by quickening combustion, which also can only be done by increasing the supply of oxygen. To effect this purpose, many ingenious arrangements have been devised, among the most useful of which may be mentioned that one which allows gas to become mingled with air before ignition, as may be observed in the various modifications of the useful lamp invented by Bunsen. By employing a mixture of coal-gas and oxygen, Deville and Debray succeeded, at the small expense of about 43 cubic feet of oxygen, in melting and refining, in forty-two minutes, 25.4 lbs. avoirdupois of platinum.

"Another very common method of augmenting the heat of a flame is by forcing a stream of air into its dark central part; the modification of flame thus produced is usually termed a blow-pipe flame, the direction of which may be readily altered by, of course, changing the direction of the air. The functions of this flame are increased, but do not materially differ from those of common flame. * * * * Instead of turning the lungs into a blowing machine, glass-workers and others who use large blow-pipe flames make use of bellows; and much might be said about the various forms of table blow-pipes, but this would lead us far from the immediate object of this paper.

"The blow-pipe was long used in the arts before it was applied to metallurgic analytical operations. We learn from Bergman, that, in the year 1738, one Anton Swab first employed this instrument for mineral analysis, and later, that Cronstedt extended its use by his valuable researches on the action of flame on native minerals.

"For want of space, however, we cannot enter fully into blow-pipe analysis. Some few general directions by which the more useful metals may be detected are all we can offer.

"The student, even to enable him to do this successfully, should make himself thoroughly familiar with some of the physical properties of the metals—*e.g.* their color; whether brittle, malleable, oxidizable, or volatilizable. Secondly, how the compounds of the various metals comport themselves when heated with fluxes. Thirdly, what color is imparted to fused beads of borax by metallic compounds.

"In order to submit a substance to the action of the blow-pipe flame, a hole about the size of a small pea is made in a piece of charcoal, (young wood charcoal is the best for this purpose,) into which the substance to be heated is placed. When a flux is to be employed it should be thoroughly mixed with the substance before applying the flame. To make the *borax beads*, the end of a piece of platinum wire must be made red hot, and then dipped into the bottle of powdered borax, a small quantity of which is thus made to adhere to the wire, which, by being slightly inclined and then again moderately heated, the borax runs in a bead to the end. The bead having been made is brought, while yet molten, into contact with a

very small quantity of the substance to be tested. The bead is then heated (care being taken not to allow it to run off the wire) in the oxidizing flame, and its color noted; again it is heated in the reducing flame, and its color noted as before.

"We append a table which may assist the student in forming his conclusion.

TABLE FOR THE DETECTION OF THE MORE USEFUL METALS BY THE BLOW-PIPE.

EXPERIMENT.	OBSERVATION.	RESULT.	
If a metal, heat on charcoal in the oxidizing flame.	Unaltered	Gold, Silver, Platinum.	
	Volatilized	Arsenic, Mercury.	
	Oxidized:		
	Yellow when hot, white when cold	Zinc, Bismuth.*	
	Bluish white	Antimony.	
	Yellow, or brownish yellow	Lead.	
	Very light yellow	Tin.	
	Dark brown, or black	Copper, Iron.†	
	White, only after protracted heating	Aluminium.	
	Volatilized	Arsenic,‡ Mercury.	
	Reduced to the metallic state:‡		
	MALEABLE. {	Yellow globule	Gold.
		Brilliant white globule	Silver.
		Yellowish ditto	Tin.
Bluish-gray ditto		Lead.	
Red powder or globule		Copper.	
Black powder 		Platinum.	
BRITTLE. {	Grayish-white globule	Antimony.	
	Reddish ditto	Bismuth.	
Converted into oxide:	Black	Iron.	
	Red-brown	Cadmium.	
	White	Aluminium.	
	Yellow when hot, white when cold	Zinc.	
	In the oxidizing flame.	In the reducing flame.	
2. Heat with borax on platinum wire.	Brownish red.	Bottle-green . . Iron.	
	Greenish blue when hot, becomes blue on cooling.	Colorless, or tinged with an opaque red Copper.	
	Bright yellow.	Whitish gray . . Silver.	

* Metallic bismuth is crystalline, and may be powdered in a mortar.

† Of course, the color of these metals serves to distinguish them.

‡ Except when in combination with fixed alkalis.

§ Often an incrustation of oxide is observed on the charcoal, just beyond the reduced globule, the color of which, and its behavior when strongly heated, should be observed.

|| The behavior of salts of iron with borax distinguishes them from those of this metal.

"ODONTOLOGICAL SOCIETY. Annual meeting, January 9, 1865. EDWIN SAUNDERS, Esq., President, in the chair.—Mr. HULME exhibited models of two cases. The first case was one which looked simply like an accumulation of tartar. It appears that the lady to whom these belonged had a much stronger attachment to her three front teeth than they had to the gum; for they were attached by tartar, and could be readily removed and replaced. The lady was in the habit of taking them out and replacing them for the last six or seven years. The curious point was that the presence of these teeth had continued to preserve, as it were, the gum; because there was no doubt that, as soon as they were permanently removed, the gum would be absorbed. The other case shows by what slight attachment a tooth may still continue attached to the gum, and how very slowly and gradually the process may take place. The tooth is entirely removed and only attached by the surface.

"Mr. KEMPTON exhibited a model of a case of arrested development of the front teeth, requesting any suggestion as to the plan that should be adopted in such case. The patient was thirteen years of age.

"Mr. VASEY would have no hesitation in extracting the two temporary teeth; there was such positive evidence of the permanent teeth being there.

"Mr. COLEMAN would supply a small temporary piece of these two teeth, chiefly with the view of promoting a more rapid development of the permanent teeth. At the same time, while producing the irritation, it would supply their place till the permanent ones made their appearance.

"Mr. HARRISON, in reference to the question put to the Society by Mr. Kempton, would say that the first question for consideration in the treatment of the case seemed to him to be this: whether, if the two temporary incisors were removed, there would be room for the two permanent incisors in the alveolar arch; and the next, whether they would, *or could*, be placed, as they were, and large as they promised to be, come down in their right position. Were these teeth only removed, he thought, there was very great doubt whether there would be room enough for them, judging of their probable size from the prominences of the gum; and whether they could take their right positions, seeing that they were situated immediately over the laterals, and were very vertically placed. He should be inclined, were the case his own, to take out the two temporary incisors in the first instance, and endeavor to ascertain, by an instrument passed up through the opening so made, the width of these permanent teeth—which, if we were to judge of it from the swellings in the gum, was something very excessive; and seeing that the laterals were very largely developed teeth. If this could not be ascertained immediately in this way, he should wait awhile, until he could feel the edges of the permanent incisors; and if, upon examination, they proved to be as broad as they seemed to be, he should then be inclined to take out the permanent laterals also, so as to let the two central incisors come down and take the entire space between the two canines. We should in that way get a regular set of teeth, although spaced; while it seemed to him that, if that were not done, and the temporary incisors only removed, we should be likely, under the circumstances, to have a couple of large centrals projecting over the two laterals, and giving a very unsightly appearance to the mouth.

"Mr. HULME said that, inasmuch as the child has arrived at that age

when we cannot calculate upon much increase in the anterior part of the jaws, the removal of the central temporary teeth would only cause the large permanent laterals to come close together, and there would be less prospect than ever of bringing the large central incisors in place. In the present swollen condition of the gum the permanent incisors looked larger than they really were, and he should think there was no objection to making an incision, and ascertaining the actual size of the permanent teeth. He did not, however, see that there was much prospect of the permanent central incisors ever being brought into their proper place in the jaw.

"Mr. HARRISON objected to making such an incision as had been suggested by Mr. Hulme, to ascertain the width of these teeth, as that tended to bring the teeth through very high up in the gum. He should prefer drawing the temporary incisors, and feeling through the aperture thus made, to making such an incision, on that account. It would be found, on examining the models, that the breadth of the centrals (as they appear from the prominence upon them) was so great that their outer edges were in a line with the edges of the canines; therefore, if they bore a size at all commensurate with their apparent size, they never could get into their places without sacrificing the permanent laterals.

"Mr. VASEY said the opening in the gum did not necessarily make the tooth come through high up, or prevent its developing the bone to the proper length. He spoke from experience, having treated a case in that way. He cut the gum across, and it did not have the effect of retarding the development downward.

"Mr. HARRISON meant that if a transverse incision were made through the gum and alveolar process (which is the only way in which the edges of the teeth could be got at) they would then be brought out through the opening so made, especially if the laterals were left standing, because the incisors are exactly over the laterals. He was quite aware that, under ordinary circumstances, if the gum is lanced high up, there being no impediment below to prevent the tooth descending, it will generally come down to its normal position; but if one tooth is situated over another, and an incision is made at the point of the upper tooth through the gum and alveolar process, the other remaining, would, in his opinion, bring the tooth set at liberty through the gum over the tooth above which it stands; and that is what he should expect would be the result in the present case.

"Mr. HULME did not contemplate cutting through the alveolar process, but simply the mucous membrane covering the margins of the teeth.

"Mr. DREW asked Mr. Coleman, as to the suggestion he had just made, whether he would propose the removal of the anterior bicuspid at all.

"Mr. COLEMAN should certainly adopt that plan, using the temporary teeth more especially with the view of promoting the more rapid eruption of these permanent central incisors. If they came into their place well-shaped teeth, he should certainly prefer removing the bicuspid, and making room in that way, to removing the laterals. The objection to leaving temporary teeth in these cases is, that they change color so, and become more conspicuous when placed by the side of permanent teeth. He was not prepared to say at present whether the bicuspid should be removed. We are very often greatly deceived by the appearance of the teeth under the gum. We cannot exactly tell what the thickness of the gum may be in proportion to the laterals; but, seeing that the canine is

a little displaced, there is hardly room, certainly not for the left, and only barely room for the right canine. He thought it probable, too, that the bicuspid must be sacrificed in order to get room for the centrals; but, if the centrals came into their position, and were good teeth, he should prefer sacrificing the two bicuspid to the two laterals.

"The president observed that the present case was one which well illustrates the value of casual communications. Either of the plans of practice may be good precedents; but, as the laterals seem to be well-formed teeth, he should rather hesitate to sacrifice them. He thought Mr. Coleman's suggestion a very wise one; an impulse has often been given to the development of the teeth which have been retarded in their growth by wearing an artificial arrangement. * * * * *

"An election for officers during the ensuing year resulted in the choice of Thomas A. Rogers, Esq., as *President*. *Vice-Presidents* (Resident)—W. A. N. Cattlin, Esq.; W. Imrie, Esq.; W. Perkins, Esq.; G. A. Ibbetson, Esq.; James Parkinson, Esq. (Non-Resident)—W. K. Bridgman, Esq., Norwich; S. Tibbs, Esq., Cheltenham; Dr. Roberts, Edinburgh; R. H. Moore, Esq., Dublin. *Treasurer*—Arnold Rogers, Esq. *Librarian*—J. B. Fletcher, Esq. *Honorary Secretaries* (Ordinary)—Alfred Coleman, Esq.; Charles Vasey, Esq. (Foreign Correspondence)—Thomas Underwood, Esq. *Councillors* (Resident)—I. Sheffield Esq.; C. J. Fox, Esq.; H. T. Kempton, Esq.; R. T. Hulme, Esq.; G. Owen, Esq.; A. Hill, Esq.; S. Cartwright, Esq.; E. J. Winterbottom, Esq.; J. Saunders, Esq.; F. Weiss, Esq.; N. Stevenson, Esq. (Non-Resident)—C. D. Rogers, Esq., Newbury; S. L. Rymer, Esq., Croydon; E. P. Parkinson, Esq., Brighton; W. Hunt, Esq., Yeovil; J. A. Baker, Esq., Dublin; T. R. M. English, Esq., Birmingham."

The retiring president then delivered an address, the following extract from which commends itself as well worth careful perusal, descriptive as it is of that eminent and successful dental practitioner, Samuel Cartwright, well and favorably known to many members of the profession in this country:—

"If we call to mind how, after some thirty-four years of laborious work, he sought repose in the quiet of the country, but after a lapse of some few years he thought fit to resume his position, and if we remember how (rare fate!) the public again rallied to his standard, we shall have no difficulty in accounting for his great and continued popularity. That he was considerably in advance of his contemporaries as a practitioner there can be no doubt, and to this is owing that he seems to us as a connecting link between the past and the present, or appears to bridge over that vast interval which separates the practice of those days from that which prevails in our own. Many things go to the making of a popular man and a successful practitioner, which, with singular felicity, were found united in him. He had good health, possessing a compact strongly knit frame, without that robustness which is incompatible with the indoor life, which is the doom of our profession. He was possessed of energy and decision, and this, with a certain kindness of manner, at once secured the confidence of his patients. He was thoroughly practical; he had his knowledge, as it were, in his fingers, and could show you how to do a thing in a more impressive manner and in a much shorter

time than a more scientific man would have taken to describe the process. He was, by the constitution of his mind, more a man of action than of contemplation, a worker rather than a thinker, and it is, therefore, hardly to be expected that he should have contributed to the literature of his profession. Indeed, the prodigious amount of work he went through in the active discharge of the duties of an extensive practice, would preclude the possibility of his doing so; nor with the aid of such works as those of Hunter, Fox, and Bell was the profession conscious of any pressing need of another treatise on the subjects. The brilliant triumphs of histological science which rewarded the labors of Purkinje, Retzius, Goodsir, Nasmyth, Owen, Tomes, and others, had not been reaped. The new world which was added to our knowledge of minute structure, and the revolution in many of the received doctrines of physiology, which resulted from the improved construction and use of the microscope, were at this time unrevealed. In a different way, however, he was doing good service to his brethren, in that he so carried himself as to make the profession respected. His hospitalities were on a scale of princely magnificence, and his house was the resort of the wit and talent of the day. The appointments of his establishment were on a scale of unusual elegance and liberality, and he surrounded himself with works of art and modern pictures at a time, be it remembered, when such a taste was exceptional. In short, in his pursuits as in his recreations, he had the instincts and the bearing of a gentleman, and it is difficult, perhaps, to estimate at its full value the effect of such an influence in determining the position of our profession in public estimation. And yet, with all this love of elegance and taste and ambition, and underlying and qualifying them, were to be seen a rare simplicity and modesty of demeanor; and though from the demands on his time and attention he might well have been excused if sometimes he appeared preoccupied and taciturn, no man was more conspicuous for geniality in the social circle. Such was the career and such the character (in its professional aspects, with which alone we have any concern) of a thoughtful, earnest, energetic, and successful man, of one whose name may well be inscribed in the roll of England's peace-heroes, the self-made men, who, from comparatively humble beginnings, rose by rapid steps till he culminated in the responsible position of assuming the professional charge of the most exalted personages during two reigns. In these remarks I trust it will not be considered that I have exceeded the due limits. To those who knew him I feel sure that no apology is necessary; to others, I trust it will appear that such a tribute was deserved and would be expected on the demise of our first president, and that the lessons to be derived from the contemplation of such a life could not be without profit. To my mind, his one salient characteristic, and which was the secret of his success, was earnestness which never fails to enlist sympathy and to inspire confidence. You see it in the admirable portrait which adorns these walls; you there see the man of prompt action and few emphatic words. This and the added charm of a modest demeanor not only went far to conciliate his rivals, but served to attach to himself a large circle of friends. Suffer me for one moment to explain what I mean by this modesty, which is very commonly though not invariably found associated with unusual talent or great achievement. It is not that abject negation of self which invites the

injustice of an under-estimate of the individual, and which implies a diffidence or distrust of his own powers or of the resources of art, but such a reasonable amount of self-assertion as is equally removed from this and from that miserable and purblind devotion of self which refuses to recognize merit in another. Some such feeling as prompted the reply of that old physician who, after a long and laborious devotion to his profession, lived in retirement at the Court of Frederick the Great. Being rallied by that brusque and eccentric monarch with, 'Come, now, Doctor, confess, do you not think that you have frequently sent your fellow-creatures out of the world before their time?' he replied, 'Alas! Sire, I fear there may be too much truth in that; but not on so grand a scale as your Majesty, nor with so much honor to myself.'"

LONDON DENTAL REVIEW—JANUARY.

"DIGITAL COMPRESSION OF THE COMMON CAROTID ARTERY IN A CASE OF HÆMORRHAGE FROM A TOOTH WHEN THE LOCAL AND INTERNAL USE OF THE PERCHLORIDE OF IRON HAD FAILED.—CURE.—The most simple therapeutic agents—and they are generally the most useful—are sometimes forgotten in practice. Can there be a more certain method of arresting hæmorrhage, and at the same time one that is more easily applied, than compression? Though all may admit this, few remember it at the moment it is required. It is only on great occasions that it is called to mind. The following case shows how important it may prove on small ones. Dr. Guisson, who has recorded the case, made use of digital compression—a plan so much in favor at the present time in the treatment of certain aneurisms:—

"A lady, aged sixty-eight, subject to attacks of intermittent fever, complained for some days of a painful swelling of the gum on the left side of the upper jaw, near the last molar tooth, of which the only remains consisted of the carious roots. On October 5th, 1863, about six o'clock in the evening, she perceived a spontaneous discharge of blood from the painful point. At ten o'clock the flow of blood was alarming. Pledgets of lint, saturated with a dilute solution of the perchloride of iron, were kept applied to the seat of the hæmorrhage; the pure solution was afterward used, and at the same time the syrup of the perchloride of iron was administered internally. The bleeding, nevertheless, continued, and the powers of the patient were becoming exhausted. It was then that Dr. Guisson decided to employ compression of the left common carotid against the cervical vertebrae by means of the fingers, a proceeding which was rendered easy by the thinness of the patient. In less than half an hour the bleeding was perceptibly diminished, and in about an hour was completely arrested.

"The compression was kept up until four o'clock in the morning, and then bleeding did not return. The patient gradually recovered from the effects of the hæmorrhage, and from the local injuries arising from the prolonged application of so active an astringent, and one so difficult to retain in the posterior part of the mouth, as the perchloride of iron."—(*Bulletin Général de Thérapeutique*, from the *Bulletin Médical du Nord de la France*, December, 1864.)

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Cranial Nerves. Extract from Annual Address before the Erie County Medical Society, by S. W. WETMORE, M.D. — “The cranial nerves are nine in number on each side, and are transmitted through foramina at the base of the skull. They are variable in their size and structure—have a great range of distribution and perform a great variety of functions. They are named numerically according to the order in which they occur, from before, backward, or pass out of the cranium. Their names are also derived from the part to which they are distributed, or from the special function appropriate to each.

“Physiologically or functionally, they admit of division into four groups, namely: nerves of special sense, nerves of common sensation, nerves of motion, and mixed nerves. It is not deemed necessary to arrange the groups in this description in a tabular form; but to notice briefly their superficial origin, direction, distribution, and a part of their functions.

“The first cranial nerve, or olfactory, getting its origin from the under and posterior surface of the anterior lobe of the brain, and passing through foramina in the cribriform plate of the ethmoid bone and distributed to the Schneiderian membrane as a special nerve of the sense of smell, gives us the power of distinguishing odors, the various kinds of which convey different impressions to the mind, and, when impaired by disease, is often an important means of diagnosis. The second, or optic, arising from the thalamus and nates of the tubercula quadrigemina, and passing by the name of the optic tract to the olivary process where its commissure is found, from the anterior surface of which each nerve proceeds to its respective foramen opticum, and is exclusively distributed to the eye as a nerve of the special sense of sight. This nerve, together with the third, fourth, and sixth, which arise respectively from the inner side of the crura cerebri, from the valve of Vieussens, and from the constricted portion of the corpora pyramidalia and passing out of the cranium through the foramen lacerum anterius or sphenoidal fissure to all the muscles of the eye, which they endow with motor influence, and, after sending filaments to the iris, performs the functions of that noble organ which is the master-piece of nature's works. By this we distinguish objects both far and near, please our fancy of beauty, view armies in battle array, and all the agreeable variety displayed in the landscape of nature; by this sense we perceive the temper and dispositions, the passions and affections of our fellow-creatures, even when they wish to keep them latent; the discerning eye will detect the deception in the countenance; it is the mirror to the soul, the index to the heart, and a stimulant to the will; in disease it furnishes symptoms which are not evinced by any other organ; through it we detect the condition of the brain, foreboding impending evil, or tending to a favorable issue. The fifth *tri-facial* or *tri-geminal* is a mixed nerve, consisting of motor and sensitive fibres and filaments of the special sense of taste. It is the largest cranial nerve, and resembles a spinal nerve in its origin by two roots and the existence of a ganglion on its

posterior root. It extends from the side of the pons varolii to the apex of the petrous portion of the temporal bone, where its sensitive filaments enter the Gasserian ganglion, from the anterior surface of which three large branches proceed, viz.: the ophthalmic, the superior and inferior maxillary nerves; they pass out of the cranium respectively through the sphenoidal fissure foramen rotundum and foramen ovale. The first division of the fifth or ophthalmic, is a sensory nerve, supplying the mucous membrane of the eye and nose, the lachrymal gland and duct, and the integument and muscles of the eyebrow and forehead, making its appearance on the face at the supra-orbital foramen. The power of common sensation being that sense by which we distinguish the different qualities of bodies, such as heat and cold, smoothness from roughness, softness from hardness, solidity, mobility, etc., and the fifth nerve, being the most acutely sensitive nerve in the whole body, it is not surprising that we are quickly admonished of foreign bodies in the eyes and nose. When this irritation is continued, either by foreign bodies, heat or cold, light or injuries, it produces not only excessive local pain, but great constitutional disturbance, with no little amount of febrile action, as is evinced in conjunctivitis and common ophthalmia.

"The superior maxillary or second division of the fifth is also a sensory nerve, and is intermediate both in size and position between the ophthalmic and inferior maxillary. It commences at the middle of the Gasserian ganglion, and after making its exit through the foramen rotundum, passes across the speno-maxillary fissure and traverses the floor of the orbit, making its appearance on the face at the infra-orbital foramen. Its branches are numerous: those of the greatest importance supply the teeth and gums of the upper jaw, the soft and hard palate, the tonsils, the antrum of Highmore, and the muscles and integument of the lower eyelid, cheek, and upper lips.

"The third division of the fifth is a compound nerve, consisting of the power of sensation, motion, and the special sense of taste. It is the largest of the three divisions, and proceeds from the lower angle of the Gasserian ganglion; after passing through the foramen ovale it is joined by the anterior or motor root and divides into two trunks, external and internal. The external division consists almost exclusively of fibres from the motor root, and is distributed to all the muscles of mastication. The internal division terminates in three branches, namely: auriculo-temporal, inferior-maxillary, and gustatory. These branches, as their names imply, are distributed to the integument of the temple and external ear, the gums and the teeth of the lower jaw, the lower part of the face and lower lip. The gustatory is distributed to the tongue, and is one of the nerves of the special sense of taste. The inferior dental enters the inferior maxillary at the dental, and makes its exit at the mental foramen. By means of the fifth pair of nerves we are endowed with the greatest pleasure allotted to man, the boon of earth's blessings, the necessities and the luxuries of life, health, happiness, wealth, and wisdom, the peculiarities of taste, the desires and imaginations of the mind, the gratification of the will, as evinced by the different senses, are all appeased by the function of this nerve.

"On the other hand, when its functions are impaired or vitiated either by disease, habit, or injury, it is susceptible of producing equally as great misery as its normal and healthy condition is conducive to happiness. Nay, even more when its special sense of taste, together with its concomi-

tant, from the Glosso-pharyngeal, is excessively gratified and becomes involved by abuse, it is often culpable of the destruction not only of health, happiness, wealth, integrity, virtue, and morality, but even of life itself. Again, when the sensitive and motor fibres of this nerve, together with the facial, are involved by disease, it is capable of producing the greatest amount of physical suffering, and the most hideous expressions of the countenance of any of the nerves in the body. This is well exemplified in *tic douloureux* on the one hand and hemiplegia of the face on the other.

"The seventh pair consists of the facial or *portio dura* and the auditory or *portio mollis*. The first or facial is the motor nerve of all the muscles of the face. It extends from the lateral tract of the medulla oblongata, or from the groove between the olivary and restiform bodies to the meatus auditorius internus, which it enters in connection with the auditory nerve. After traversing the canal, it makes its exit at the stylo-mastoid foramen, and is distributed on the side of the face in a radiated direction under the name of the *pes anserinus*.

"The second division or auditory is the special nerve of the sense of hearing. It arises from the posterior median fissure in the floor of the fourth ventricle, winding around the corpora restiformia from which it receives fibres, and entering with the facial the meatus auditorius internus, and is exclusively distributed to the cochlea vestibula and semicircular canals. By the sense of hearing we distinguish sounds, and are capable of enjoying all the agreeable charms of music; by it we are enabled to receive instruction, discipline the mind, communicate our thoughts and intentions, our wishes and desires, and enjoy the pleasures of society; and by it our reason is rendered capable of exerting its utmost power and energy.

"Pathologically it is one of the first to become impaired by disease, is often rendered obtuse, dull, and imperfect, and is symptomatic of various conditions, not only of the organ of hearing, but of the nervous centres, as is evinced by an accumulation of cerumen in the meatus or *linitus aurium* and deafness in fevers, or preceding apoplexy, hysteria, and epilepsy.

"The eighth pair consists of three nerves, viz.: glosso-pharyngeal, pneumogastric, and spinal accessory. They all arise from the lateral tract of the cord immediately behind the olivary process. The third division, or spinal accessory, arises by two portions, a vagus and a spinal portion. The latter portion gets its origin as low down as the sixth cervical nerve; the three nerves pass out of the cranium through the jugular foramen. The first division or glosso-pharyngeal, is a compound nerve, and is distributed to the mucous membrane of the fauces and base of the tongue, the mucous glands of the mouth and tonsils; it is the nerve of sensation to the mucous membrane of the pharynx, fauces, and tonsils—of motion to the pharyngeal muscles, and a special nerve of taste in all parts of the tongue to which it is distributed. The second division of pneumogastric is composed of both sensitive and motor filaments; it has a more extensive distribution than any of the other cranial nerves; it is the nerve of the respiratory organs and the upper part of the alimentary canal, sending branches to the larynx, trachea, lungs, pharynx, œsophagus, stomach, and heart; it supplies the organs of the voice and respiration with motor and sensitive fibres, and the pharynx, œsophagus, stomach, and heart with motor influence. The third division, or spinal accessory, is a nerve of motion, and is distributed to the sterno-mastoid and trapezius mus-

cles, communicating freely with the cervical nerves. The ninth, or hypoglossal, arises from the groove between the corpora pyramidalia and corpora olivaria; it emerges through the anterior condyloid foramen, and is distributed to all parts of the tongue as a motor nerve. This nerve is said to consist of both motor and sensitive filaments, in consequence of convulsive movements being produced in the tongue when the fibres of the nerve are irritated in any part of its course. This, however, according to *Longet*, is owing to its inosculations with sensitive nerves after it emerges from the skull. His experiments having shown conclusively that if it is irritated at its origin it is entirely insensible.

"I have thus hastily, briefly, and very imperfectly given the superficial or apparent origin, distribution, and functions of the cranial nerves, and have but casually noticed their relations to medicine and surgery.

"Under the head of practical remarks, it will be necessary to acknowledge the existence of deep fibres or roots of these cerebro-spinal centre nerves, which may in all instances be traced deeply into the superior and inferior cerebral masses, consisting of both white and gray matter; though, says *Van Der Konk*, this examination is one of the most difficult investigations in minute anatomy. The peculiar softness of these parts, the fact that they are destroyed by slight pressure, the extraordinary minuteness and delicacy of their tissue, their primitive filaments being quite imperceptible to the naked eye, while it is with difficulty that, under a tolerably strong magnifying power, a single thread can be followed even for a very short space.

"Practically the brain is divisible into cerebrum, cerebellum, pons variolii, and medulla oblongata. The various diseases and injuries common to these parts are evidenced by the nerve arising from these positions. Through them in disease we are furnished with very important diagnostic symptoms; by them we are enabled to judge in some instances of the modes of death, particularly of coma, paralysis, and necramia.

"In coma, which signifies that the superior masses or cerebrum is involved, whether from injury or narcotic poison, the first, second, and third nerves are our chief aids in diagnosis, particularly the third, which supplies the iris with motor influence.

"If, however, the cause persists or be increased and is severe, the excito-motory functions become more or less involved; if slight, one pupil may be dilated and the other contracted. This condition sometimes exists in apoplexy, and is of very unfavorable import, indicating irritation of the upper portion of the spinal medulla as well as oppression of the superior masses. Irritation of the spinal medulla may produce symptoms as various as its causes are numerous; it may simply produce cerebral excitement manifested by *tiinitus aurium*, *muscæ volitantes*, numbness, and tingling sensations in the limbs, loss of memory, confusion of ideas, hallucinations, or in its usual signs of intoxication, and in delirium or convulsions, vomiting, hiccough, contracted pupil, etc.

"This is often the case when the narcotic poisons have been administered, such as conium, belladonna, alcohol in large quantities, carbonic acid, ether, chloroform introduced by inhalation, and sometimes the excrementitious matter in the blood and bile. Opium and its preparations sometimes produce the same effects before destroying the functions of the superior masses of the nervous system. But if that portion termed by Sir Charles Bell the respiratory tract be involved sufficiently to suspend the functions of the respiratory nerves, death occurs instantaneously from paralysis of the second division of the eighth pair or vagus, which sup-

plies the lungs and heart with motor influence. If, however, portions of the medulla oblongata be simply irritated sufficiently to produce reflex action, various physiological changes are produced which are peculiar to themselves.

"This is well exemplified by irritation of the floor of the fourth ventricle, which increases the glycogenic function of the liver to such an extent that diabetic urine is the result. Concerning the organic changes, there is another condition which exists and of a chronic character, involving portions of the encephalic mass, from which the deep fibres of the cranial nerves emerge. It has become an established fact, that in those who have by disease of the brain lost their speech, the corpora olivaria is found in a softened, broken-down, disintegrated condition, and in those who are congenitally dumb, those bodies are very much atrophied. The same can be said of the corpora restiformia in congenital deafness, the deep fibres of the auditory nerve being traced into the ganglionic cells of this body.

"Again, in strabismus convergens, produced by repeated convulsions, the upper portion of the corpora pyramidalia is found materially changed, this being the origin of the abducens, or sixth nerve, which supplies the external rectus muscle with motor filaments. Many more pathological conditions might be enumerated, showing the anatomical relations of the *cranial nerves to medicine and surgery*; but time will not permit. I will, therefore, submit these feeble suggestions for your consideration, trusting your acquiescence of the necessity of a more thorough knowledge of *Practical Anatomy*."—(*Buffalo Med. and Surg. Jour.*)

Wounds of Face.—"Wounds of the face are chiefly to be regretted on account of the deformity and disfigurement resulting therefrom. The extreme vascularity of the tissues of the face endows them with a vitality which rectifies most injuries with a rapidity truly marvelous; and from their great distensibility the surgeon is enabled to repair loss of tissue, even when this has been very extensive. The face has been wounded in almost every part and direction, and often presents a most ghastly appearance. The upper and lower jaws, respectively, have frequently been, to a greater or less extent, destroyed, and yet speedy recovery follow. At the battle of Antietam, a soldier had both eyes destroyed by one ball, which passed through the bridge of the nose, leaving a clean hole. He suffered but little pain, and made a rapid recovery.

"Hæmorrhage is undoubtedly the greatest source of danger in gunshot wounds of the face; and, from the great difficulty of commanding it, frequently places the patient in imminent danger. Those who have received a severe face wound, seldom leave the field without sustaining a considerable loss of blood; and secondary hæmorrhage is common when the bones have been fractured. The irregularity and extreme vascularity of the parts render the application of ligatures to the bleeding points difficult; and to be effectual, compresses must be applied with much nicety. In secondary hæmorrhage of the deep branches of the face, ligature of the main artery will generally be necessary.

"The branches of the facial nerve are sometimes so much injured in face wounds, either by the ball itself or by spicula of bone, that temporary or even permanent paralysis may ensue.

"The greatest care should always be taken to remove the secretions which result from injury of the bones of the face. For if any amount of it should be swallowed, and thus enter the stomach, much constitutional

disturbance will follow, and a fever of a low typhoid and very fatal type will be induced.

"Fractures of the bones of the face form an exception to the general rule, of removing fragments which are nearly detached. The large supply of blood in this region frequently enables pieces of bone—whose direction is not opposed to a proper union—to resume their full connection, in a manner which would be impossible in other parts under the same relative circumstances.

"The curious manner in which balls may be concealed in the bones of the face, and be discharged of their own accord, is shown in an instance which occurred at the Alma, and is related by Macleod. 'A round ball had entered close to, but below, the inner canthus of the eye, and being lost was not further thought of. The wound healed, and the patient had almost forgotten the circumstance, when, after suffering slightly from dryness in the nostril, the ball fell from his nose, to his great alarm and astonishment, several months afterward.' This case is singular, from the absence of the fetid discharge which usually attends such injuries of bones, with a retained ball."—(DR. A. R. BECKER, *Boston Med. and Surg. Journal.*)

"Excision of the Tongue. By JAMES SYME, ESQ., Prof. of Clinical Surgery in the University of Edinburgh, etc.—Some years ago I endeavored on two occasions to afford relief from disease of the tongue, otherwise incurable, by cutting out the entire organ; but, as both cases terminated unfavorably, I felt no desire to repeat the experiment, and have repeatedly declined doing so under circumstances of a very urgent character.

"In the early part of November last, Mr. W., aged fifty-two, from Manchester, applied to me on account of a very formidable morbid condition, affecting his tongue. From its point to the root it was swollen and indurated, the surface being of a brown color and roughly tuberculated, so as to resemble the back of a toad. It was also nearly quite immovable, and, from completely filling the mouth, not only prevented articulation, but rendered deglutition impossible with respect to solids and extremely difficult in regard to fluids. From the same state of matters, there was a most offensive fetor through mucus secreted by the unhealthy surface not being permitted to escape.

"The patient informed me in writing that he had suffered from uneasiness in his tongue for many years, but that neither articulation nor deglutition was seriously affected until 1862, since which time he had been under medical treatment in London as well as Manchester without experiencing any benefit. As palliation seemed all that could be expected, I offered some suggestions with this view, and advised that no time should be lost in returning home. But soon after his arrival there I began to receive from the patient very painful letters, reporting aggravation of the symptoms, especially in regard to deglutition, so that death from starvation seemed imminent, and urgently desiring some means of relief. To these appeals, I replied that the only effectual remedy was removal of the tongue, and that this could not be done without very serious danger to life, so that the operation promised nothing more than a chance of escape. This slight encouragement brought the patient back, and he arrived here on the 27th of December.

"Being thus, as it were, compelled to make another trial of excision, I carefully considered all the circumstances concerned that might tend to interfere with its successful performance. Of these, the one which most

prominently presented itself was the prevention of voluntary deglutition that must result from depriving the os hyoides of the power by which it is drawn forward. In the common cases of cut-throat, where a large transverse wound is made into the pharynx, although the suicide rarely accomplishes his object in the first instance, he still more rarely escapes the fatal effect of pulmonary inflammation induced by irritation propagated from the larynx; and I did not forget that both the patients on whom I had performed the operation in question died from purulent effusion into the lungs. Instead, therefore, of cutting through all the muscles of the os hyoides, as had been done in the former cases, I resolved to retain the mylo-hyodei and genio-hyodei entire, and divide merely the attachments of the genio-hyoglossi. I also thought it would be better to perform the operation without chloroform, since the patient, instead of lying horizontally, might thus be seated on a chair, so as to let the blood run out of his mouth and not pass backward into the pharynx.

"The operation was performed on the 29th, with the assistance of Mr. Annandale, Dr. Sewell, and Mr. Cheyne, to the first of whom I am especially indebted for his able co-operation. Having extracted one of the front incisors, I cut through the middle of the lip and continued the incision down to the os hyoides, then sawed through the jaw in the same line, and, insinuating my finger under the tongue as a guide to the knife, divided the mucous lining of the mouth, together with the attachment of the genio-hyoglossi. While the two halves of the bone were held apart, I dissected backward and cut through the hyoglossi along with the mucous membrane covering them, so as to allow the tongue to be pulled forward and bring into view the situation of the lingual arteries, which were cut and tied, first on one side and then on the other. The process might now have been at once completed, had I not feared that the epiglottis might be implicated in the disease, which extended beyond the reach of my finger, and thus suffer injury from the knife if used without a guide. I therefore cut away about two-thirds of the tongue, and then, being able to reach the os hyoides with my finger, retained it there while the remaining attachments were divided by the knife in my other hand close to the bone. Some small arterial branches having been tied, the edges of the wound were brought together and retained by silver sutures, except at the lowest part, where the ligatures were allowed to maintain a drain for the discharge of fluids from the cavity.

"Next day I visited the patient, and finding him in all respects comfortable, inquired if he could swallow. In reply he pointed to a drinking-cup containing milk, and intimated that he wished it to be filled; then, placing the spout between his lips, while his head was bent backward, he drank the whole without any cough or sputtering. Having seen this, I felt assured that the result would be satisfactory, and was not disappointed, as everything went on well afterward. The only inconvenience experienced was from the edges of the jaw being occasionally displaced; but this was easily remedied by an ingenious contrivance of Mr. Wilson, the dentist, who, finding that a silver cap inclosing the teeth was not sufficient for the purpose, fashioned a shield of gutta-percha, embracing the chin on each side, and secured to the metal-plate by a wire.

"Under an ample supply of nourishment by milk, soup, and soft solid food, there was a rapid return of strength, so that an improvement in this respect was almost daily observable, and before the end of three weeks the patient declared that he had never felt better in his life. He returned to Manchester on the 23d of January.

"Excision of the tongue has thus afforded complete relief in a case of the most formidable and distressing disease. How far the relief thus obtained may prove permanent, and how far it may admit of being extended to cases of a similar kind, are questions that can be determined only by experience. But the frequency of malignant growth affecting the tongue in an otherwise sound state of the system urgently requires the truth to be ascertained in regard to the value of a remedial measure; and if the operation is now, as I trust it has been, freed from the chief danger attending its performance, facts sufficient for the purpose will probably ere long be accumulated."—(*Lancet*.)

"*Congenital Cleft Palate—Closure of the Fissure by Operation.* (Under the care of MR. FRANCIS MASON.)—In reference to this case Mr. Mason said that in introducing the stitches he had acted upon the advice, so often given by Mr. Fergusson, of not approximating the margin too closely, for should there be any subsequent swelling of the parts there would be sure to be a drag on the stitches, and sloughing would be apt to occur. In this case there was a space of a quarter of an inch between the edges of the wound in the situation of the front stitch; nevertheless, as the result showed, there was perfect adhesion at that part.

"M. H., aged 17, was admitted into King's College Hospital, under the care of Mr. Mason, on August 29, 1864, with a congenital cleft palate, the fissure extending through the soft, and through nearly an inch of the hard palate. The patient was a strumous-looking girl, but enjoyed good health. She had had no hare-lip.

"August 30.—Mr. Mason proceeded to close the fissure in the soft palate, adopting the method recommended and practiced by Mr. Fergusson; three silk threads were introduced. The patient was ordered a generous liquid diet, and strictly enjoined not to speak.

"September 2, (third day after the operation.)—The stitches were removed, and union of soft palate found perfect. There remained, however, a small opening, about one-sixth of an inch in size, in the hard palate.

"14th.—The parts having become quite firm, she was discharged to go into the country, and requested to return at a future time to have the hard palate closed."—(*Med. Times and Gaz.*)

Tumor of the Lower Lip.—MR. COLLIS exhibited to the Pathological Society of Dublin "a portion of the lower lip, removed from a female past the middle period of life, who exhibited a singular appearance from this redundancy. This tumor was one of the erectile class, a form of tumor which was found in the lip and about the genital organs, in the groin, and in variously shaped redundancy about the nose, giving a grotesque appearance to the physiognomy. There was very little interest in this specimen, except in a clinical point of view. The woman presented herself first in the month of last November. The tumor was very large and much diffused through the lip. It was not a tumor which could be isolated with a sweep of the knife and taken out completely; so he made a transverse incision across the inside of the lip, and picked out as much of the tumor as he could. The result was a very considerable diminution in the size of the lip. The wound, however, did not entirely heal, a small opening remaining, which discharged pus continually. The fragments of the growth which were scattered through the lip inflamed; they seemed to aggregate themselves together and to grow again; and after return-

ing to the country for a time she came back a week ago with the lip nearly as large as ever. On the second occasion, however, he found that, owing to the results of the former operation and the subsequent inflammatory action, a different mode of proceeding was advisable; he was able to isolate the disease, and accordingly he removed it by a V incision. Mr. Collis then made a section of the tumor, and said it was composed of erectile tissue—that is, of large quantities of veins with a few tortuous arteries and a good deal of elastic tissue. This fibro-elastic tissue had a white appearance and a tough feel; there was also a central cavity lined with a velvety membrane, into which some fragments of veins could be traced.”—(*Dublin Med. Press.*)

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“Lodgment of False Teeth in the Œsophagus. By JOHN SWINBURNE, M.D., of Albany, N. Y.—A few evenings since, Dr. Bailey, of this city, called on me late at night, saying that one of his patients had swallowed two false teeth, with the gold plate attached, and that the mass was lodged in the œsophagus between the os hyoid and the sternum.

“From a case which had been previously brought to my knowledge, and which resulted fatally, I was naturally led to ruminate upon the most feasible and safe method of extraction. The result of the fatal case, a short history of which I will give by way of illustration, admonished me that the bucket or sponge of the probang was inadmissible on account of the nature of the foreign body.

“Then the merit of the gullet forceps was discussed with favor, *i.e.* if the substance sought was within its reach or above the sternum.

“Excision was in turn mentally discussed, and to such an extent that during our walk to the house, my friend thought me a very silent companion.

“The patient was sitting up, and expectorating a large amount of thick, tough mucus, as the result of the irritation, and seemed very anxious as to the result. She was soon quieted. Upon examination, I found the foreign body occupying the position indicated by the doctor.

“The gullet forceps were passed so as to find the metallic body, when the blades were opened so as to grasp the object. The first and second attempts at extraction failed, while the third effort was crowned with full success, and though the forceps lost their hold upon the arm of the gold plate, just as it emerged from the fauces, I had the satisfaction of seeing the body forcibly thrown forward into the mouth, greatly to the joy of our patient.

“The plate was about one and a half inches in length and three-fourths of an inch in width, one clasp of which had been broken off, and which was the cause of the disaster. These were two front teeth, attached close together, while the two arms reach out some distance on either side, to obtain firm hold of the adjoining teeth, making the plate really much longer than it would otherwise have been.

“The other case occurred in April, 1861.

“In the course of some altercations, P. B., a young, strong, and vigorous man, received a blow in the mouth, which broke the clasps of a gold plate containing four false teeth. This slid into the fauces, and produced much choking and strangling; soon this ceased in a measure; still he felt that it had not passed down beyond the sternum, though he stated to me that he swallowed fluid freely. The injury occurred about one P.M., and he partook freely of soup and milk at seven P.M. Up to the time when the probang was passed, the pain felt was near the sternum or below the

larynx. At eight o'clock P.M., he proceeded to the office of a physician, when the button of the probang was passed and the patient forcibly withdrew the instrument. Four consecutive attempts were made with the bucket, and twice did the patient forcibly withdraw the instrument. The attendant pain he described as being very severe, followed by vomiting, and spitting of much blood at the time. This continued freely all night, and most of next day. Much clotted blood was vomited. At eight and a half o'clock the same evening, the patient called upon another physician, who simply explored the parts with the sponge probang, discovered the nature of the injury, and desisted from any further effort. About eleven P.M., emphysema was discovered, over a space equal to about ten inches in diameter, and extending over the upper end of sternum, face, and neck, and most upon the right side. I saw the patient the next day, and found the condition as described. The fact that the lung had been wounded, either from the bucket of the probang or the gold plate, coupled with other symptoms, such as dyspnœa, etc., induced me to advise non-interference. The subsequent post-mortem confirmed the prudence of the advice.

"This patient died some days subsequent, after severe suffering, being unable to swallow solid food, and fluids only in a very limited quantity, while the dyspnœa remained exceedingly oppressive.

"DISSECTION.—Post-mortem about twenty-four hours after death. The emphysema still existed to some extent. There was much swelling of the neck, which, upon dissection, proved to be composed principally of imperfectly formed pus, holding in suspension a large amount of flocculent, fibrous tissue, looking not unlike shreds of linen or cotton fibre, mixed intimately with pus; the abscess extended several inches in front, from the sternum to the os hyoid, isolating the œsophagus for about two inches, and burrowing among the muscles of the right side of the neck. The plate was found obliquely across the neck, just behind the superior border of the sternum, its concavity looking forward and upward, its right extremity was the lowest, being in contact with the lung.

"The œsophagus was ulcerated through, on both sides, so that all the fluid food taken passed out of its right side, and thence run into and filled the pleural cavity. Of course, pleuro-pneumonia supervened, and resulted in compression and destruction of the lung proper.

"I found the plate, as before stated, contained four teeth, three together on the left side—a space of two teeth intervening, and the fourth tooth was placed on a prong or shaft—both clasps were broken, leaving the remaining plate about one and a half inches in length, and about three-fourths of an inch wide, while the edges of the plate were so sharp as readily to cut through the tissues, upon the application of any considerable force, sufficient to change the longitudinal axis to a transverse one, as would be the case if the bucket of the probang were to be caught on the inferior border of the plate near its centre.

"The question naturally arises, would the same result have followed if the gullet forceps had been used? Would the blades of the forceps occupy the same amount of space as the bucket? Would not the long axis of the plate naturally correspond with that of the œsophagus? and would not the passage of the bucket by the side of the plate naturally force it out of the longitudinal axis? Could the bucket be made to pass by so large a body without rupturing the œsophagus? Is there any obstacle to the passage of this or any other body at this point, any more than there is at any point above? If not, then why was not the œsoph-

agus cut above the point indicated? That the wound in the œsophagus was not the result of ulceration alone, is evidenced by the fact that much blood and vomiting followed the efforts at extraction, as did also the emphysema, showing that the wound in the lung and œsophagus was produced nearly simultaneously, and was probably the result of either the spasmodic vomiting or the efforts at extraction. In a case of this kind the forceps present this advantage, that they need not be passed by the foreign body, but rather grasp the superior presenting part, and thence keep the long axis of the plate parallel. By this means it is possible, that material injury to the soft parts might have been avoided. By this I do not mean to cast any imputation, since any of us, without due reflection, would unquestionably fall into the same error, if error it was.

"I frankly confess, that without the experience arising from this case, I should have applied the bucket to the case herein reported as having been so successfully relieved by the gullet forceps. The probabilities are, that no treatment would have changed the status of the fatal case, still it is equally important that we should bear in mind the dangers which beset the extraction of this kind of foreign substance; and, also, the importance of using the kind of instrument which is the most effectual and the least dangerous to life.

"I have the verbal history of two cases which proved fatal from suffocation before any relief could be extended, and all from a little neglect in wearing plates with but one clasp. Before any attempt at removal be tried, the nature of the foreign body should be taken into consideration. If it be of such a nature as to be readily passed through the alimentary canal, and no objections to its passage either down the œsophagus or through the alimentary canal, then it should be passed down at once.

"On the contrary, if it be a large or irregular mass, and of such a nature that it cannot be safely passed through the œsophagus, nor pass readily out of the stomach, then it should be extracted, and that too by some instrument like forceps, which can seize the superior portion, and thus be extracted as it passed down, *i.e.* the long axis of the foreign body shall correspond to the long axis of the œsophagus."—(*Med. and Surg. Reporter.*)

"*Odontological Society of Great Britain.*—At a meeting of this Society on February 6, the Secretary read a paper by Mr. Cartwright and himself 'Upon the Skulls of Hythe Church, Kent.' The writers, after stating how the bones were arranged at the above church, gave reasons for disbelieving the traditionary account of how they had been collected—*viz.*, after a great battle between the Danes and Saxons; the appearance of the skulls, and the number of them that had belonged to children and probably to females, were contrary to such a view. The maxillæ principally occupied their attention; the alveolar arches were all well developed, and the teeth were in quality much finer than are usually seen in the present day. Irregularities of any kind were uncommon amongst them. In many cases they were much worn, probably from food containing much of the outer husk of the grain, and grit from the rude utensils used in preparing it. Caries existed, but to a less extent than is seen in the present day; it occurred generally on the masticating surfaces of the teeth, and was attended in most cases with alveolar abscess. Mr. Coleman read a paper 'On Certain Forms of Irregularity and their Treatment.' The object of this paper, as stated by the writer, was to bring before the Society certain views propounded by Mr. Cartwright at a former meeting,

and which had not been fully discussed. Mr. Cartwright's opinion was, that the increasing prevalence of contracted dental arches was ascribable to increasing civilization with selective breeding. This view was fully adopted by the writer, who adduced a large number of observations which told in its favor; he also agreed with the same authority in the treatment of cases of contracted maxillæ, with irregularly placed teeth; but in some cases he advocated a line of treatment not commonly pursued by dental practitioners."—(*Med. Times and Gaz.*)

Third Dentition.—In a letter from Brazil to the *Dub. Med. Press*, DR. RICHARD DE GUMBLETON DAUNT states that "in this city, Campinas, San Paulo, exists a person (a mulatto girl, badly organized as to the menstrual functions, with a severe chronic cough, a chronic discharge from the ear, with occasional severe earache, but not rachitic) in whom the second set of teeth were shed during convalescence from a fever at the age of 14, and were succeeded by a third dentition, which resulted in as fine and perfect a set of teeth as may anywhere be seen."

Solution of India-Rubber.—"A solution of caoutchouc or India-rubber, for repairing India-rubber shoes and for fastening leather soles upon rubber shoes, is prepared in the following manner: Cut two pounds of caoutchouc into thin, small slices; put them in a vessel of tinned sheet-iron, and pour over twelve to fourteen pounds of sulphide of carbon. For the promotion of solution, place the vessel in another containing water previously heated up to about 86° Fahrenheit. The solution will take place promptly; but the fluid will thicken very soon, and thus render the application difficult if not impossible. In order to prevent this thickening and difficulty, a solution of caoutchouc and rosin (colophony) in spirits of turpentine must be added to the solution of caoutchouc in sulphide of carbon, and in such quantity that the mixture obtains the consistency of a thin paste. The solution of caoutchouc and rosin in spirits of turpentine should be prepared as follows: Cut one pound of caoutchouc into thin, small slices; heat them in a suitable vessel over a moderate coal fire until the caoutchouc becomes fluid, then add one-half pound of powdered rosin, and melt both materials at a moderate heat. When these materials are perfectly fluid, then gradually add three to four pounds of spirits of turpentine in small portions, and stir well. By the addition of this last solution, the rapid thickening and hardening of the compound will be prevented, and a mixture obtained fully answering the purpose of gluing together rubber surface, etc."—(*Am. Drug. Circ.*)

Plasticity of Sulphur.—"MM. MOUTIER and DIETZENBACHER presented a note to the Acad. of Sci. '*On a Property of Sulphur.*' The second of these gentlemen showed some time ago that sulphur melted with a small proportion of iodine retained its plastic state. The authors now show that a number of other substances—naphthaline, paraffin, camphor, oil, wax, etc.—confer the same property. The mixture with some of these substances is insoluble in sulphide of carbon. Carbon also greatly modifies the properties of sulphur, rendering it completely fluid at 270°."—(*Chem. News.*)

Hardening of Burnt Clay.—"At Rivières they make tiles and bricks of a sandy clay which contains 32 per cent. of chalk. When first burnt they are so tender that, unless they are carefully handled, they fall to pieces.

As soon, however, as they are cold enough to touch, they are quickly removed from the furnace and carefully stacked. They are then soused with water, by the action of which they are so hardened that they may be used the next day for building. This fact is, perhaps, easily capable of a chemical explanation, and brickmakers may be able to gather a hint from it."—(*Ibid.*)

"*Camphor Water as a Solvent for Salts.*—It is more convenient to measure a liquid than to weigh a solid; many salts are therefore kept in solution, but they are at the same time very bad keepers. A very simple and efficacious mode of keeping them is to use *aqua camphorata*, i.e. a saturated solution of camphor in water, as the solvent. Placing a piece of camphor in a solution already made is equally good."—(*Year Book of Pharmacy and Ibid.*)

"*Water-Proof Cement.*—MR. JOSEPH SCHOFIELD, of Wappelo, Iowa, writes us that he makes a valuable water-proof cement by the following recipe: Take new sweet cheese and work it in hot water until the butter or greasy portion is all removed. This changes the cheese into a tenacious slimy mass. When thoroughly washed, remove the cheese to a hot stove, and knead a quantity of air-slacked lime in so that the mass will be sufficiently stiff for use. It must be applied forthwith, as it sets rapidly. The articles to be joined must be heated quite hot, as high as 200°, or scalding water, then united and bound so they will remain in contact until set; in about three days the articles may be used. It is said that this cement is capital for aquaria; also for wood, glass, and stone, or earthenware. Mr. Schofield states that he has tried it on a steam boiler, and that he made a 'soft patch,' so called by boiler makers, with great success.

"As the materials from which this cement is made can be had anywhere in rural districts, it will be well for engineers and housekeepers to bear it in mind."—(*Sci. Amer.*)

"*A new kind of Electrifying Machine.*—The electro-magnetic coil has, in a great measure, superseded the electrifying machine: the latter, however, will never cease to be an object of interest; and, it is probable, will always be preferred for some purposes. The expense and difficulty of managing large plates and cylinders of glass have hitherto been obstacles to the use of large electrifying machines. These obstacles appear now removed—glass being rendered unnecessary by the discovery of a far more convenient and effective material. M. Edmond Bequerel exhibited to the Academy of Sciences on a recent occasion an electrifying machine, the plate of which was made of indurated red sulphur, the invention of a civil engineer. It was eighty centimetres in diameter, and afforded a spark fourteen centimetres in length. No amalgamated cushions were required with it, the skin of a cat being quite sufficient to produce every desired effect. Sulphur undergoes extraordinary changes by successive fusions; becoming extremely hard and tenacious. After the third fusion it no longer acts on metals, or possesses its characteristic odor. The plate used by M. Bequerel was formed by fusing the sulphur three times in a cast-iron vessel, at a temperature between 250° and 300° Cent., and allowing it, after each fusion, to cool thoroughly. After the first and second fusions it was crushed to a coarse powder; and, after the third, it was poured into a plaster mould. Plates four metres in diameter may

easily be made in this way; they cost extremely little; and, besides being more efficient, are far less hygrometric than glass."—(*Intellectual Observer*.)

"Prevention of Rust in Iron.—Many a valuable hint is to be obtained from an intelligent practical laboring man, which may lead the philosopher into a train of ideas that may, perhaps, result in discoveries or inventions of great importance. When bricklayers leave off work for a day or two, as from Saturday to Monday, they push their trowel in and out of the moist mortar, so that the bright steel may be smeared all over with a film of it, and find this plan an effectual remedy against rust. In Wren's 'Parentalia' there is a passage bearing upon this subject: 'In taking out iron cramps and ties from stonework, at least 400 years old, which were so bedded in mortar that all air was perfectly excluded, the iron appeared as fresh as from the forge.' Oxygen, which is the main cause of rust, is abundant in the composition of both water and the atmosphere; and that quicklime has an astonishing affinity for it is evinced in the homely practice of preserving polished steel or iron goods, such as fire-irons, fenders, and the front of 'bright stoves,' when not in use, by shaking a little powdered lime on them out of a muslin bag, which is found sufficient to prevent their rusting. Another instance, very different and far more delicate, bearing upon the same principles: the manufacturers of needles, watch-springs, cutlery, etc. generally introduce a small packet of quicklime into the same box or parcel with polished steel goods, as security from rust, before sending it to a distant customer, or stowing it away for future use. These cases are extremely curious, because, as a general rule, bright steel or iron has a most powerful affinity for oxygen; consequently it is very readily acted upon by damp, and is rusted in a short time, either by decomposing the water and obtaining oxygen from that source, or direct from the atmosphere. It is not absolutely essential that the quicklime should be in actual contact with the metal, but if somewhere near, as in the case of the parcel of lime packed up with the needles or watch-springs, the bright metal will remain a long while without the least alteration in its appearance; the lime (which is already an oxide of calcium) either receiving an additional dose of oxygen or being converted into a carbonate of lime."—(*Am. Drug. Circ.*)

"Drilling and Turning Glass.—Glass may be readily drilled by using a steel drill, hardened but not drawn at all, wet with spirits of turpentine. Run the drill fast and feed light. Grind the drill with a long point, and plenty of clearness, and no difficulty will be experienced. The operation will be more speedy if the turpentine be saturated with camphor gum. With a hard tool thus lubricated, glass can be drilled with small holes, say up to three-sixteenths, about as rapidly as cast-steel. A breast or row drill may be used, care being taken to hold the stock steady, so as not to break the drill. To file glass, take a twelve-inch mill file, single cut, and wet it with the above-mentioned solution, turpentine saturated with camphor, and the work can be shaped as easily and almost as fast as if the material were brass.

"To turn glass in a lathe, put a file in the tool stock and wet with turpentine and camphor as before. To square up glass tubes, put them on a hard wood mandrel, made by driving an iron rod with centres through a block of cherry, chestnut, or soft maple, and use the flat of a single-cut file in the tool post, wet as before. Run slow. Large holes may be

rapidly cut by a tube-shaped steel tool, cut like a file on the angular surface, or with fine teeth after the manner of a rose-bit, great care being necessary, of course, to back up the glass fairly with lead plates or otherwise to prevent breakage from unequal pressure. This tool does not require an extremely fast motion. Lubricate as before. Neat jobs of boring and fitting in glass may be made by these simple means. I have endeavored to turn glass rods with diamond-pointed steel tools, etc., but without success. The whole secret lies in good high steel, worked low, tempered high, and wet with turpentine standing on gum camphor."—(*Sci. Amer.*)

"Some Properties of Glass.—Glass resists the action of all acids except the 'fluoric.' It loses nothing in weight by use or age. It is more capable than all other substances of receiving the highest degree of polish. If melted seven times over and properly cooled in the furnace, it will receive a polish rivaling almost the diamond in brilliancy. It is capable of receiving the richest colors procured from gold or other metallic coloring, and will retain its original brilliancy of hue for ages. Medals, too, imbedded in glass, can be made to retain forever their original purity and appearance.

"Another singular property of glass is shown in the fact, that when the furnace, as the workmen term it, is settled, the metal is perfectly plain and clear; but if by accident the metal becomes too cool to work, and the furnace heat requires to be raised, the glass, which had before remained in the open pots perfectly calm and plain, immediately becomes agitated or boiling. The glass rises in a mass of spongy matter and bubbles, and is rendered worthless. A change is, however, effected by throwing a tumbler of water upon the metal, when the agitation immediately ceases, and the glass assumes its original quiet and clearness."—(*Ibid.*)

"New Method of Electro-Plating.—M. WELL, a French chemist, announces a new method of depositing metals. The baths he employs consist of metallic salts or oxides in alkaline solutions by means of tartaric acid, glycerin, albumen, or other substances, which prevent the precipitation of the oxide by the fixed alkali, in some cases with and in others without the aid of zinc or lead, and at various temperatures, according to circumstances. He claims also to be able, by like means, to give variety of color to articles covered with copper by his process. M. Well says that the most important application of his discovery is the deposit of copper and the bronzing of iron (cast as well as wrought) and steel, without the preparatory dressings with conducting substances, which are necessary in proceeding according to the ordinary methods before the object is placed in the bath and submitted to galvanic action. This, if it bear the test of practice, is a very important fact. Iron and steel thus coated with copper may, says M. Well, be afterward silvered or nickelized by his process."—(*Ibid.*)

"Aluminium.—M. CORBELLI has found a simpler and more economical process for procuring aluminium than that heretofore used. The metal is prepared from clay first carefully purified from foreign matter; then dried and treated by an acid to remove iron. About six times its weight of sulphuric acid will answer this purpose. The clay is then allowed to settle, dried again, and mixed with about twice its weight of

Prussiate of potassa, the quantity of which is to be increased or diminished according to the content of silica in the clay. To this mixture one and a half times the weight of the clay is added of common salt—the mixture placed in a crucible and heated to a white heat. After cooling, the aluminium will be found at the bottom of the crucible.”—(*Cosmos and Journ. of Frank. Inst.*)

Reproduction of Pencil Drawings.—“It has been found that *pencil drawings* may be reproduced in any number, with great facility. For this purpose they are to be moistened with dilute acid, and then inked with a roller. Only the pencil marks will take the ink, and the drawing may then be transferred to metal or stone, in the usual way, by pressure.”—(*Intellectual Observer.*)

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Lectures on Surgical Pathology. Delivered at the Royal College of Surgeons of England. By JAMES PAGET, F.R.S., Surgeon Extraordinary to her Majesty the Queen; Surgeon in Ordinary to his Royal Highness the Prince of Wales; Surgeon to St. Bartholomew's and Christ's Hospital. Revised and edited by William Turner, M.B. and F.R.C.S.E., F.R.S.E., Senior Demonstrator of Anatomy in the University of Edinburgh. Third American Edition, with 117 Illustrations. Philadelphia: Lindsay & Blakiston, 1865.

This very valuable work has already acquired such a well-established reputation, as to require neither an extended notice nor critical review. Hence very little more need be said, than simply to announce the publication of this handsome, new, and revised edition of a well-known standard book, although for those unacquainted therewith, it might be desirable to state that it is replete with information on one of the fundamental branches of medical science, and should be carefully studied by every one interested in medicine, whether general or special, it being applicable to the dentist as well as the physician and surgeon.

The Pharmacist's and Druggist's Practical Receipt Book. With a Glossary of Medical Terms, and copious Index. By THOMAS F. BRANSTON. Philadelphia: Lindsay & Blakiston, 1865.

This work presents in a condensed form much valuable information on a variety of topics, arranged in alphabetical order. It is mainly designed as “a useful manual of reference to the Chemist, Druggist, and Medical Practitioner,” but will also, to a considerable extent, meet the wants of the dentist. The following extracts will serve to exhibit its general character, and illustrate its practical value to the last:—

“Bisulphuret or Bisulphide of Carbon.”—Prepared from heated charcoal and sulphur. A transparent colorless liquid, density 1.272, boils at 110° F. A good solvent of sulphur and phosphorus, and used also as a solvent of India-rubber and gutta-percha.”

“Gold, detergent.”—Fresh slaked lime, 1 oz., water, 1 pint, pearlash, 2 oz., water, 1 quart. Mix the two solutions, agitate occasionally, and in an hour decant and bottle the clear liquor. Used to clean gilding, by washing with a sponge, and afterward rinsing with clean water.”

The typography, binding, and general getting up of both these books are such as to reflect credit on the publishers, and commend them to students.

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, MAY, 1865.

No. 10.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Caries and Necrosis of the Alveoli and Maxillary Bones.—In the two preceding numbers of the DENTAL COSMOS, some general remarks have been made on the above subjects, and we think sufficient to at least caution the dentist with regard to the treatment of such diseases when they fall in his way, if not to instruct him in some of the leading features of those affections. These diseases are so often complicated with unhealthy conditions of the system that it is seldom the treatment of them comes within the province of dental practice. We will cite a few simple cases which the dentist may treat, if it be convenient for him to give them attention.

Ten years since, a lady, thirty years of age, called, suffering from a swelling over the right superior lateral incisor, in which the pulp had been dead for some time; the gum was a good deal swollen, and discharging pus from two openings. By sounding with the probe we found that a portion of the outer wall of the alveolus was dead and detached; a small incision was made and the spicula of bone removed, about half as large as the little finger nail; a small tent of cotton, renewed every day, was kept in the opening for a few days, saturated with a small quantity of creosote; the parts soon healed over, and, up to this time, remain in as healthy a state as the gum ever is over a tooth in which the pulp is dead. No alveolar abscess has since occurred.

A young lady, fourteen years of age, called three months since, suffering from a large swelling over the right superior lateral incisor, in which the pulp had been dead six years. It was extremely loose; the swelling extended to the front incisor and canine of that side; they were also very loose; we feared that extensive injury of the bone would be the result. The parts presented a purple appearance, soft and flabby. We lanced

the gum over the lateral, the same as lancing a gum boil; a quantity of sanious pus was discharged; we placed in the orifice a tent of cotton, saturated with creosote, and painted the gum over with iodine; this was renewed every day for about one week, when the parts grew much better; the teeth became much more firm; we removed a portion of the external wall of the alveolus of the lateral incisor, as long as the little finger nail and about half as wide. The parts soon assumed a normal appearance, the teeth grew firmer and are saved, but appearances indicated the loss of the whole three at first.

Both these patients were of the nervo-lymphatic temperament.

A gentleman, about forty years of age, nervo-sanguine temperament, was under our hands, having his teeth generally put in order. We noticed a slight tumefaction over the right superior lateral incisor; on pressing the finger on it, pus was observed to ooze from the roof of the mouth; the patient was not aware that anything was amiss. From the purple hue of the gum we suspected caries and necrosis of the bone; the removal of the tooth was advised and reluctantly consented to. The alveolus was kept open with a tent of cotton, and the parts well examined next day. The bottom of the socket was found to be necrosed, and a portion of the palatine process of the right maxillary bone. It was very hard and firm; we scraped away small granules of the bone from time to time, and changed the tent of cotton, saturated with creosote and nitrate of silver alternately, two or three times a week, kept the patient on good and stimulating diet, and removing granules of bone as we conveniently could, until we finally passed through the floor of the anterior nares. The walls of the cavity had, by this time, narrowed down to about the size of a crow-quill, and seemed to be well covered with healthy granulations; there was some bleeding from the nostril, which soon ceased. The tent of cotton was left out, and the parts healed up soundly. The patient was in the office the day before writing this paper, and the parts are looking as healthy as if nothing had ever been the matter.

(To be continued.)

PHYSIOLOGY OF THE TEETH.

BY C. P. FITCH, M. D.

Read before the New York Society of Dental Surgeons.

THE subject which constitutes the theme of this paper, and the topic for the evening's consideration, is Physiology of the Teeth.

You will perceive at a glance that an examination of this question must embrace a notice of the nature and functions of these organs.

In considering the first division of this subject, I propose to notice briefly their origin, structure, and relative vitality.

1st. Their origin. The view generally entertained upon this point is this. The teeth are considered both epidermic and dermic structures; that is, the basement membrane lies between the enamel and the dentine. The enamel produced external to this membrane is, in consequence, regarded as epidermic. The dentine produced internal to this structure, or in the sub-basement tissue, is from this fact considered dermic.

Another view, entertained by Professor Huxley, is that both the enamel and dentine are developed beneath the basement membrane, and regarded by him as pertaining to the dermic structures.

From recent investigations conducted by Lionel S. Beale, an English microscopist and histologist of extended research and observation in this direction, the teeth are regarded as epidermic in their origin. The enamel, dentine, and cementum are elaborated from epidermic cells.

This gentleman affirms that a tooth is developed from an aggregation of cells upon the surface of the mucous membrane; that this mass of cells has no capsule proper; but that which has been regarded heretofore as such is nothing more than a pushing out and flattening of the external layer of cells by the growth of new cells in the centre; thus, by this process, a pellicle is constituted simulating a delicate fibrous capsule, covering the central cells. A tooth has its origin in this central collection of cells. This aggregation of cells is soon covered by a reduplication of mucous membrane, which constitutes the tooth sac proper, and ultimately becomes the periosteum of the root.

2d. A tooth is composed of three distinct structures, each peculiar to itself—the enamel, dentine, and cementum. In many of the mammalia the cementum covers the enamel, and constitutes the greater part of the structure composing the tooth; but in relation to a human tooth, this substance covers only the dentine of the root. If, as is claimed by some, this substance covers the enamel of a human tooth, yet the covering is very thin, composed of one or two layers of cementum cells only, and this at the time of the eruption of the tooth.

It is quite unnecessary for me, at this time, to consider the separate structures entering into the formation of a tooth, more than to say, that the enamel, which is the external structure, is composed of hexagonal cells, rendered more dense than the other parts of the tooth by the presence of a larger amount of the lime salts. The dentine, which constitutes the greater part of the tooth, is composed of ciliated cells, so arranged as to produce a tubular structure. The cementum, which covers the root, is more dense than bone, and yet, in some respects, it resembles bone. By the aid of the microscope, the lacunæ of bone are clearly discernible in this structure.

3d. The vitality of a tooth is quite low. Of all the structures composing the human body, this substance possesses the least vitality. Hence the teeth are not as fully under the control of that force which is denom-

inated vital as are the other organs, for all other tissues are dominated by this force, or, in other words, receive a larger quantity of it. Yet during the development of a tooth it is dominated by just enough of vital force to produce enamel, dentine, and cementum.

The enamel is less vital than the dentine, owing to a larger amount of the earthy constituents in its composition.

The cementum possesses more vitality than the dentine, arising from an opposite condition of its structure. Vitality increases as we travel from hard to soft structures, or to nervous mass. Tooth, bone, ligament, fibrous tissue, muscle, and neurine, is the order of the vital increase.

Loss of tooth substance is not replaced by reproduction, as is the case with some of the other structures. It is very questionable whether nutrition is carried on in a tooth, so far as waste and replacement are concerned, after development; but that a tooth, through the nutritive act, continues to receive accessions to its earthy constituents until quite a late period of life, thereby increasing its density, and rendering it less destructible from the action of foreign agents, is a matter quite well settled.

Every physical act in the economy involves the expenditure of vital force, and the loss of structure. But the teeth seem to be an exception to this law. If at all applicable, it is so in a very limited sense.

The functions of the teeth may be considered in two particulars—that of mastication and facial expression.

Comminution of food, an act inservient to nutrition, seems to be the primary function assigned them by nature.

Their form, size, and angular contour determine man to be omnivorous, and at the same time fix his position in the scale of organized existences. They constitute him a representative being. In other words, the structures of all inferior animal nature find in man reduplication. Thus, the inferior animal existences have in him a typical significance. From this view of the subject, the teeth must ever remain a cutting rebuke upon all attempts on the part of some would-be reformers to reduce man to the level of the carnivora, on the one hand, or to that of the herbivora, on the other, in the character of his food.

Thus we find in man the incisive and canine teeth for cutting and lacerating; the semi-incisive teeth for cutting and triturating; and the molars for crushing and grinding the harder substances presented for mastication.

The act of thorough mastication is quite essential in a physiological point of view. But its importance is too well understood by this body to need further remark from me.

The teeth contribute in a very remarkable degree to the production of proper facial expression, and their loss is quickly perceived and deprecated. There enters into the computation of elements contributing to facial expression, all the component parts constituting the human face. Harmony

of development and action between these elements yields a natural pleasing expression.

If any one or more of these component parts are either wanting in development, or limited or negated in their action, deformity of expression at once ensues. Malformation of expression is in exact ratio of the abnormal complications, both in substance and function, which are involved in the primary lesion. Hence the loss of the teeth affects a greater extent of facial surface than any other single portion of the face. The muscles of expression rest very considerably upon the teeth, and when removed, either by disease or at the hands of the charlatan, the position and action of these muscles are essentially changed. Indeed, at times, they suffer in substance by atrophy. In some respects, such malformations can never be fully removed, and the parts entirely restored to a normal condition by artificial dentures, although in some instances approximal restoration may be reached.

Hence the preservation of these beautiful and highly serviceable organs in all their normal completeness is a matter of paramount importance to the dental practitioner.

RELATIONS OF MEDICINE AND DENTISTRY.

BY WM. H. ATKINSON, M.D.

Read before the New York Society of Dental Surgeons.

THE relations of the medical to the dental profession grow out of and are analogous to the differences of the organs and diseases which respectively come under their care. General medicine has always been jealous of every specialty when not practiced by those regularly educated as physicians, not even excepting the general surgeon.

Nothing short of the absolute necessity of a skill and steadiness of heart and hand which the physician proper could not command, if (indeed the order of mind and character requisite to medicine proper *can*) attain, has been able to reconcile the exclusives to toleration and fraternization with general or special surgery, when distinctly practiced as an exclusive profession. Out of this senseless exclusiveness and obstinacy have resulted most, if not all, the specialties in the healing art, medical and surgical.

So very general had the investigations and studies of anatomy, physiology, and pathology become, that a vagueness unsatisfactory to practitioner and patient had so crippled the diagnosis and prognosis of disease, and administration of remedies, that the necessity of a more philosophic course of study and treatment forced itself upon the people and individual members of the healing fraternity, out of which the care of the organs of special sense fell to the lot of particular individuals who made them objects of special and extended study.

Thus sprang into existence a set of men claiming professional honors, immunities, and compensations, equal to, no less than the recognition of those who are engaged in medicine in a more general way, arrogating to themselves the only status of "doctor." To such extent had this ignoring of special study prevailed, that no work on anatomy gives more than very meagre account of the development, use, and diseases to which the *teeth* are liable, until forced to do so by having the demand distinctly pronounced by the wants of the people, which had been awakened by the improved practical knowledge of the teeth attained and practiced by the little-esteemed branch of (the so-called "mechanic art") dentistry.

Granting that dentistry owes its present elevation to the study of teeth "*in the mouths of living patients, whose sufferings taught the importance of UNDERSTANDING more fully the nature, use, and dangers to which TEETH stood exposed!*" To whom do we owe it that this necessity was upon us? And to what is the present wide-spread ignorance respecting the dental organs attributable in pre-eminent degree? I unhesitatingly reply, to *old* anatomists and writers and practitioners of medicine. I say *OLD*, because since we have had a few men in dentistry worthy the name of professional in their attainments, anatomy no longer excludes the germination, development, and microscopic character of the teeth from respectable place, space, and mention in its text-books. Instance, "Gray," "Leidy," and the later editions of "Wilson."

Such being the state of facts, what else than scorn and neglect could be expected from the *medical man* toward the *dentist*?

Such were the relations heretofore subsisting between medicine and dentistry. It becomes us at this time to inquire how far this picture portrays present status and respective "relation" of the two callings?

Without doubt every respectable operator in the dental field has some standing among the medical men of his acquaintance. But how many, or rather what proportion of those composing the dental profession are this day regarded as worthy of consultation in maladies of other parts of the economy arising from the teeth by the medical men in whose charge such cases are found? It would probably be impossible to reply correctly and definitely to this question in the absence of statistics showing the actual standing of the facts in the case.

But another question will not be unprofitable, if we ask it in the spirit of inquiry respecting the relations subsisting between fellow-members of dentistry as well as medicine. Does that open frankness which characterizes intelligence and true dignity always obtain, even among ourselves, when cases of consultation arise about which there is doubt as to what course is best to pursue for the suffering? The ignoring of our body as a profession by the doctors of the past has begotten a spirit of disrespect, and a retaliatory ignoring of the opinions of the doctors by us, except in special cases.

There is a common ground of fraternization that neither can ignore much longer, and that is, the patients who employ both physicians, surgeons, and dentists *are* becoming so well instructed in the construction and functions of their own bodies, that neither can much longer ignore true science in the other, nor assume greater familiarity with the calling of the other, than he actually possesses, if he would not be detected and despised accordingly.

Thus there is a necessity upon us to become well grounded in the principles that underlie general medicine, if we would practice any of its specialties, especially that very demonstrable one of which we claim to be the champions and oracles.

When high morality of purpose and respectability of position will not control, pecuniary considerations make it of the first importance for professional men, of whatever phase of the healing art, to post themselves respectably before taking upon them the responsibilities of administering to the wants of an increasingly intelligent public.

In just so far as the representatives of medicine and dentistry are mutually well educated, their relations are truly professional and fraternal; and on the other hand, in just so far as either is founded upon the sand, criminations and recriminations, with jealousies and inharmony, will display themselves when such come in contact in the various fields of practice. In many things dentistry is in the advance of medicine, one of which is the interest taken in association, out of which so much of good is sure to arise to any body of men so engaging. Another is the freedom of inquiry and communication subsisting among all the really "*live*" men in the specialty.

In one word, the present and prospective relations of medicine and dentistry are satisfactory—increasingly so. The more medical men know of dentistry, and the more dentists know of medicine, the more perfectly will they work together to the advantage of professions and people.

ALVEOLAR ABSCESS.

BY J. W. CLOWES, D.D.S.

A paper read before the Brooklyn Dental Association.

"A DEAD tooth always has a discharge from it." Thus, less than two years ago, I thought, and spoke, and wrote; and the veracity of statement was so fully impressed upon my mind that I commiserated the mental calibre that could not comprehend it. For over twenty years I had daily been accustomed to see dead teeth almost invariably accompanied by fistulous openings. Inflamed and ulcerated gums, neuralgia, impaired vision, hardness of hearing, and sore throats were too often the concomitants of this diseased condition. Hence I came to believe and to argue

that, whenever deceased dentals were allowed to occupy alveolar space, any of these forms of trouble might be found, or suspected at least. Therefore, standing, as I believed, upon the basal rock of truth, I proclaimed boldly that a dead tooth is to the jaw-bone what a nail or splinter would be in the same place. I had learned from early personal experience that a nail and splinter are *especially* foreign to the toe or finger of a boy. What follows their occupancy—even for a brief period—of either of these parts? Soreness, festering, and flaw, or their synonyms, inflammation, suppuration, and discharge. If the eyes of my patients were affected, I looked for the cause in one or more of the upper front teeth; if the facial nerves were unstrung, the bicuspid or molars were subject to suspicion; if the ear or the throat complained, the wisdom teeth were accounted responsible. Drawing my conclusions from all this, I said: "Oh, the folly and wickedness of nerve-killing." To me it was a matter of heartfelt gratulation that *that* reproach could not be laid at *my* door. I looked upon teeth, leaden-hued and deathlike, upon abscesses deep, and issues foul, and in sorrow of heart exclaimed: "What a great sin! Who shall stay it?" The evils that arose from this source were legion, and many of them horrible to contemplate, but the panacea of *extraction* removed and cured them all. Humbly but earnestly walking by the faith that my action was right and well founded, I sincerely believed that I did much good in the world by the process of extraction. The world moves! Ay, this planet upon which we have been placed to perform our allotted parts, does indeed move; and it revolves not *from* but *toward* the light! And as the sun illumines and warms and blesses the physical earth, so that grander Sun of Wisdom, and Power, and Love, is dissipating the darkness and the shadow from the mental night, and its cheering rays, even here, fill us with hope, and joy, and gladness. In the belief that a dead tooth *must* always be connected with discharge, there was one little disturbing *trace* of a doubt; but small as it was, like the "cloud no bigger than a man's hand," and weak as it seemed, there was size and strength enough in it to unsettle my proofs. As an exception to my general rule I admitted it as affirmative evidence, and very logically decided (in the absence of an external opening at the apex of the root) that it must be *somewhere* else; and indeed it was, sometimes down through the alveolus and at others through the dental canal. Now, Mr. President, I come to the point where I first perceived the light "under a new dispensation." By this light I see and believe that *some* dead teeth have *no* discharge from them. Thus, we shall confess, when submitted to the tests of fact and science, that the exceptional little trace of doubt is as big a truth as the more general declaration. While I admit the reception of new light, I deplore my inability to diffuse it as intelligibly as I desire. But my intentions and my efforts shall be sincere and earnest. Sometimes when the dental pulp is undergoing the process of decedence, it takes on an

atrophied condition; in other words, it wastes away, dries up—becomes mummy-like. Odorless and innocuous, the spirit and essence of contagion have departed from it. The molecules at the apical foramen and at the alveolus bottom, cast it off joyfully—give it a good-by—and go on with their functional work of absorption and nutrition. Alveolar abscess! this is the elephant “we have all seen;” and too long, with scarcely let or hinderance, it has been on a furious rampage among the fairest and choicest gifts of God. We know what gives it birth, and what sustains it; and—Heaven be thanked!—we know its prevention and its cure. Alveolar abscess, as formerly defined, was a membranous sac or elongation of the dental periosteum attached to the extreme point of the root, and styled by some a pus manufactory, or reservoir for fetid and corrosive matter. Nature was supposed to employ this means to gradually dissolve the dead and offending bone, and thus, after awhile, get rid of it. If this supposition *was* true, we may say at least that the process was exceeding slow. Under this impression of its action, many a good tooth has been extracted, and nature considered helped—and well helped in her time of need. Of one thing we felt sure: that the dead tooth *caused* the abscess; for *when* it was taken away the abscess ceased. Could any evidence be more positive than this? And yet, my friends, it was neither good nor positive evidence, for it was not founded in truth. The discovery of the real and true cause of alveolar abscess in dental science, was an advancing step, ay more, it was a grand stride—a jubilant leap over the barriers of fossilized opinion and chronic belief; its value to the profession is inestimable. By it the mysterious and difficult are made plain and easy; and who shall say that the restoration of a dead tooth to pure and healthful surroundings, and itself healthful in the midst of health, is not, in a limited and finite sense, a resurrection from the dead? You will recollect I told you of some dead teeth upon which abscesses were never found, and I attributed their exemption to atrophy of the dental pulp. On the contrary, your true abscess breeder is a plethoric condition of this same pulp. Under these circumstances, the spirit of evil enters and abides *within* the tooth, and its malign afflatus is so offensive to the pure life-presence that inhabits the molecules of the surrounding parts, that the whole *vis vitæ* of the nutritive system is aroused to indignant action. The pyogenic membrane, that sac which surrounds the apex of the root, is an exudate or wall of separation, thrown up by capillaries as a defense against the common enemy. Fiercely and long the contest has often raged, and well we know how the useful and good have fallen, and perished in the fight, but we had no knowledge of relief or power of salvation, and the sacrifice was before our eyes, and assisted by our hands. The *cause* of alveolar abscess is within the tooth. *It is the plethoric and defunct pulp.* It is from this pestilent mass that the effluvia of miasm and poison arise to the life-

presence in the molecules without. At this stand-point of perception in our glorious science, how easily we account for the old errors that beset us in the past! We were in the dark *then*, and stumbled; but the dawning light is growing brighter and brighter. We desired more light, and have received it. And our aspirations now go up for the full effulgence of the perfect day.

Mr. President, at our last meeting I was appointed one of the essayists for this evening. I could not appreciate the selection, as far as myself was concerned; for not to teach, but to learn was the original purpose of my advent here. As a silent but attentive listener, I have never gone away from these meetings without an increase, in knowledge, to my professional stock. To desire wisdom, to have a receptive mind, to be diligent in pursuit, and vigilant in retention, is commendable and praiseworthy; but to impart knowledge, to cast into the hopper of progress the smallest grains, and to contribute but a mole-hill to the mountain of science, is worthier far. As I look around me here, familiar faces meet my view; but far more numerous than they, are the unfamiliar and the strange.

Why are they here? What unseen motives sway?
 Why darts from eye to eye the electric ray?
 What moves in unison this associate heart?
 And why so eager each to act his part?
 Good angels surely must these minds inspire;
 How else this "ardent wish, this fond desire"
 To grow in knowledge, and the truth believe,
 As happy to *impart* as to receive?
 Why are they here, the gray-beard and the youth?
 The unseen motive what? 'Tis only truth.
 The electric fire a joyful message sends,
 And each and all are eager to be friends.

NECROSIS OF THE TEETH.

BY C. P. FITCH, M.D.

Read before the Brooklyn Dental Association.

THE term necrosis is derived from the Greek word *νεκρω*, which signifies "I kill." Necrosis of the teeth may be partial or entire: partial where the pulp is destroyed; entire where the pulp and periodontium are both devitalized. Necrosis affects the animal life, and not the molecular integrity of the tooth, whereas caries destroys both its animal and molecular existence. It is to bone what gangrene is to the soft structures. But this can hardly be said to be the case in any sense as referable to the teeth. The indications of the existence of partial necrosis are—

1st. Change in color. This, at first, may be slight; yet the natural life-like brilliancy or translucency of the tooth is gone, and an expressionless

opacity, more or less colored, has taken its place. This opacity assumes a variety of hue, yet it is well defined, and, to the educated eye, is always distinguished from the complexion of normal tooth structure.

2d. The structure is destitute of sensibility; the interglobular space, the point most tender in a normal condition, is entirely void of feeling whenever the tooth is partially necrosed.

3d. Thermal changes make no perceptible impression upon it.

4th. The presence of a fistula, discharging pus from an alveolar abscess, may determine the existence of this condition.

5th. A tender point, indurated in its character, upon the gum, on a line with the point of the root, may decide this condition.

6th. A minute point of cicatritial tissue upon the gum, an unmistakable evidence of a former existing fistula, may point accurately to this pathological state.

In case of entire necrosis, the tooth is ready to fall from its socket; or, if not so, this result is remotely certain. There can be no mistake made in regard to diagnosing a case of this kind.

The most frequent cause of partial necrosis is the exposure and death of the pulp, however produced. But frequently this condition arises from mechanical injury, destroying the pulp, if not implicating the health of the periodontal membrane. Quite often this condition arises from thermal changes communicated to the pulp from the presence of metallic stoppings. Absorption of the gum and alveolus from the neck and root of the tooth may, and often does, produce its death.

We inquire, can a tooth be rendered serviceable after partial necrosis has taken place? We answer decidedly in the affirmative. What are the most efficient means to be adopted to secure this desirable result? Treat pathological conditions in an efficient manner, in harmony with the laws of development, or, in other words, according to the measure of vitality recognized in these organs—

1st. Remove all irritating agencies from around and within the tooth.

2d. Restore the lost structure, whether soft or hard, by some non-irritable and indestructible substance.

These positions, thus aphoristically stated, embrace an approximal restoration to normal complexion, by a resort to some bleaching process, by which process, the tooth structure is either relieved of substances within the tubuli of the tooth, or infiltrated by agents which entirely change its color.

The best methods of bleaching teeth I do not propose at this time to consider, but merely to call attention to the fact in passing.

It should be observed that there always exists an imperative necessity of supplying the loss of the pulp with a substance indestructible in its essential elements; non-irritant in its effects upon the contiguous structures; at the same time readily introduced to the apical foramen, and

susceptible of being made impervious to fluids throughout the entire canal of the root; with the possibility of removal, if necessary.

Cotton slightly moistened in creosote possesses the above characteristics in an eminent degree.

Having indicated some general lines of thought in diagnosis, causes, and treatment of necrosis, I leave the subject for your further consideration in the discussions of the evening.

GALVANISM IN THE MOUTH.

BY C. G. DAVIS.

THE Rev. Dr. S., who was formerly a physician, a gentleman of correct and accurate observation, and of a highly susceptible nervous system, gives the following interesting personal history.

Having applied to a dentist for treatment, he had a small cavity in the posterior approximal surface of the right superior second bicuspid filled with gold, while the anterior surface of the first molar, having in it "*too small*" (?) a cavity to fill with gold, as stated by the dentist, was "*temporarily*" filled with amalgam "until it should get larger and he had more time."

The next day the patient was amazed by a burring sensation in the head, which, in a short time, increased to the rumbling of a train of cars or a carriage on the street. These sounds were at first attributed to such causes; but, on leaving his study for the street, he would find no cars or carriages to produce the sound. After a few days the right side of his face became numb in a degree; the tongue upon that side could not be controlled perfectly, the speech became impeded and thickened, and the sputa, when ejected from the mouth, went out at the right corner in spite of effort to the contrary. In short, all the symptoms of partial paralysis were present.

This numbness was attended by much pain, especially intense in the supra-orbital portion of the ophthalmic branch of the trigeminus.

After suffering for two weeks without discovering the cause, it occurred to him that the amalgam filling might have something to do with it, and accordingly had it removed. The relief was instantaneous, the burring and racket in his head ceased altogether, and the nervous pain was greatly relieved.

However, there still remained an irritation and discomfort about the teeth, and he had, after a few days, the bicuspid removed. On splitting the root, the nerve was found converted into pus. In like manner in a few days from this the molar was extracted and the pulp and nerves found also to be pus. But the mischief did not stop here. The second bicuspid on the left side was also troublesome, and was removed and found to be in the precise condition of the others.

All of these teeth were sound except the two first, had exceedingly small cavities, which, under ordinary circumstances, could not have given uneasiness. The case is interesting, as it shows how mischievous a continuous current of galvanism may prove even when generated in the feeblest manner, and it admonishes the thoughtless not to put metals of opposite states of electricity too near each other in the mouth.

NEW BEDFORD, MASS., April 5, 1865.

NEW YORK SOCIETY OF DENTAL SURGEONS.

BY A. C. CASTLE, M.D.

IN the March number of the DENTAL COSMOS was published, under the caption "New York Society of Dental Surgeons," what purports to be Mr. Odell's phonographic report of the proceedings of this Society for Wednesday, April 6, 1864. I regret to be compelled to say that this report is Mr. Odell's report not of the proceedings (sayings) of the members, but the phonography of his brain.

In the first place, being represented as Dr. Cassell, in answer to an important question, "*How to overcome the difficulty of procuring a correct impression of the posterior part of the palatine arch of the roof of the mouth to secure a close-fitting plate upon its posterior line,*" I am represented as saying, "That I constantly met with this difficulty, and I had seen the plates from the hands of our most accomplished scientific mechanical dentists exhibit the marks of the pincers where the posterior line of the plate had been bent upward to meet the soft tissues, or the palatine arch itself. That where the palatine bones extended far backward, this difficulty did not so often present itself; but where the palatine bones were short, the soft tissues were more loose, and were drawn down by depressing the jaw with the act of taking an impression," etc.

I expressed myself "dissatisfied," not with Dr. Hawes' impression of a mouth exhibited, but with Dr. Franklin and Dr. Allen's *debate*. Avoiding the proposition, they indulged in elaborate disquisitions on the expansion of beeswax, the crystallization of plaster of Paris, and (by Dr. Allen) the *non-contraction* (!) of metal casting as he arranged the compound metal. Every anatomist will understand that in the act of gaping, or widely extending the mouth while submitting to the process of taking a wax or plaster of Paris impression of the upper jaw, that the action of the *mastoido-mento-hyoid*al (digastricus) and the pterygo-staphylin, the palato-pharyngeus muscles, these, with the *constrictor isthmi faucium* forming the arches of which the *uvula* is pendent from the anterior arch, pull down the circumflexus or circular curtain of the soft palatine arch; while the palato-pharyngeus contracts the arch of the fauces. This

contraction of the soft palatine arch naturally curves the wax or plaster downward, as the finer line of the horizontal letter *Q* curves downward. Hence the posterior line of the plate does not fit to the posterior palatine arch or roof of the mouth when the parts are normal in rest position. The question is worth the consideration of every mechanical dentist.

The next misrepresentation partly compromises Dr. Allen, who, in remarks upon the perfection of dental mechanism applied to the mouths of patients, said: "If people would *only apply to honest* dentists and the work *was properly done*, the artificial dentures would never fail to give satisfaction. I believe that the system *I* have adopted and pursue, is the most perfect that man can make," etc.

To this singular appeal to the people to apply "only to honest dentists" and failure would never occur, I drew Dr. Allen's attention to the case of the late Dr. Wheeler. I did not send my friend (Dr. W.) as "phonographically" reported. Dr. W. applied to Dr. Allen to have a complete masticating apparatus constructed to *enable him to masticate* his food. I had made, some twenty years previous, an upper set and partial lower set of teeth on gold for the doctor. What with repairing, patching, and adding teeth to them, the mass presented anything but a piece of dental art. The doctor, from long use, however, could with difficulty "make out" with them, and could not "get on" without them. His case was a remarkable one—which I stated, but which is not reported. Dr. Wheeler, æt. 72, of sero-lymphatic temperament, and for many years of gouty diathesis, with disposition to gravel, limy deposits in the joints of the fingers and toes, with a general ossification of the cartilaginous tissues—the vertebral cartilages especially. Under these peculiar complications of organic derangement, had the doctor lived a few years longer, his whole frame would have been massed into a state of complete ankylosis. In this condition his jaw was partially implicated; the ossification or limification of the cartilages of the maxillary muscles and limy deposit in the maxillary joints permitted a perpendicular action only to the lower jaw, the lateral on grinding the food motion was destroyed or prevented. Dr. W. could *mash* his food by bringing the teeth together; he could not grind his food. Under these circumstances, I declined either to annoy the doctor or myself. Dr. Allen "thought he could overcome these organic and physical obstacles," and honestly went to work to do so. The teeth were made *secundem artem*. They fitted well, they articulated well, and in every respect they were a finished artistic piece of dental mechanism. But! the doctor failed to make them answer the purposes of mastication, not from any want of skill, but from an overweening desire to do an impossibility. The moral of my remarks was, that *honest* dentists daily fail not only from physical impossibilities, but from nervous, irritable, and *won't-be-pleased* patients, who are the periodical annoyance to every dental practitioner.

NEW YORK, March 20, 1865.

THE PROGRESS OF DENTAL SURGERY.

BY E. N. HARRIS, D.D.S., OF BOSTON.

An Essay read before the Massachusetts Dental Society, March 6, 1865.

IN response to the appointment of myself as essayist of this evening, I have prepared a short paper upon the PROGRESS OF DENTAL SURGERY.

To write anything like a correct history of the progress of our art, from its earliest practice down to the present day, would occupy more space, and require more time and ability than I am able to give it. I must therefore beg your indulgence for the very brief manner in which I shall present it to you.

The practice of dentistry, as you are all aware, began at a very early period. We are informed by antiquated records, that the art was practiced (no doubt very rudely) nearly five hundred years before Christ came into the world.

Herodotus, who was born 484 years B.C., the oldest Greek writer whose works are now in existence, and who was styled by Cicero "The Father of History," is the first of the ancient writers who makes any mention of the teeth in connection with the art of healing. Speaking of the Egyptians, he said "that the care of the teeth was assigned to particular sets of persons, that there is an individual healer for each distemper; some take charge of the eyes, others of the ears, *the teeth*, the stomach, liver, etc.; hence the whole country is filled with healers." It is generally conceded that dentistry, as a distinct branch of medical science, originated in Egypt.

From this early period to the seventeenth century, the record of the art is obscure, and from all the information that can be obtained, it made very slow progress, with but little, if any, advancement or improvement. During the latter part of the eighteenth century dentistry was revived and practiced in Paris, and valuable works on the teeth were written by French, English, and German writers. About that period dental surgery found its way to America. We are informed that it was introduced at the time of the Revolution by the surgeons who accompanied our French allies, and also by special practitioners.

Here, in our own country, the science and art of dentistry have, by the skill, cultivation, and education of American practitioners, been raised from obscurity, advanced, and placed in the front ranks of surgical science. Thirty-five or forty years ago, two or three dentists were sufficient for the practice of Boston; about the same number for Philadelphia, and in the same proportion for New York, and other Atlantic cities, while the great West and South were obliged to depend upon itinerating dental operators who strolled from place to place, most of them never taking occasion to repeat their visits.

In those days dentistry was, for the most part, a secret art. It made little if any pretensions to be a liberal or a learned profession. There were, however, a few noble instances of men of skill and liberality who labored earnestly to advance the science, and who occupied places of distinction as dental practitioners, and were bright ornaments to the profession.

As dentists increased in numbers, operations were performed more skillfully and effectively, and many improvements in operative and mechanical dentistry were achieved, and rapid advancement was made in the method of preparing and inserting artificial teeth.

In 1825 there were not more than one hundred dentists in the United States. In 1860, it was estimated, from the most authentic information, that there were five thousand practicing dentists in the whole United States; and at this time, 1865, there are probably upwards of six thousand persons in this country engaged in the practice of this important and advancing profession. Where one person employed a dentist forty years ago, one hundred do now, and the demand for the services of practitioners of dentistry cannot be so easily supplied now as it was then.

There have been over one hundred publications on dentistry written by American authors, and some of these are universally acknowledged to be the best treatises on this subject that have been published in any language, and are considered everywhere the standard works on dental surgery.

We have also a good number of able and respectable periodicals, monthlies and quarterlies, devoted to the interests of the profession and the advancement of dentistry. Besides these journals and publications, which have been of vast practical benefit to dental practitioners, and have contributed largely to elevate and dignify the profession, we have the various local, State, and national dental associations, and four colleges of dental surgery in successful operation, sending forth annually to the world their classes of graduates who have received a thorough professional education.

These different dental societies have done and are doing a good work. They deserve and should receive our hearty co-operation. They have done much to break down the barriers of selfishness and secret methods of practice among dentists, and are doing away with the unwillingness to impart to others in the profession the knowledge we may possess, which was formerly a serious obstacle to the progress of our art, and to proficiency in its practice.

Our dental associations promote friendly intercourse among dentists, and they serve for mutual assistance in inquiry and attainment, and inspire their members with professional pride, a laudable zeal, and an earnest desire to press forward and improve and excel in our dental manipulations. And they are gradually reforming the low standard of pro-

professional competency which formerly existed, and which we are sorry to be obliged to admit, still exists in too many instances at the present day.

Our dental colleges have been of incalculable advantage to the profession, and I think their importance as affording the best means to the dental student for obtaining a thorough theoretical and practical education, in connection with his term of pupilage with a private preceptor, cannot be too highly estimated.

We are indebted to the professors and graduates of our dental colleges for most of our standard text-books, and for a large portion of our most valuable dental literature. To our country belongs the high honor of originating and introducing this collegiate system of dental education, and of successfully establishing the first regular dental college in the world.

In my opinion, the members of this and all other dental associations, and dentists everywhere, are in duty bound to give their influence and encouragement toward sustaining the dental colleges. These institutions are to the dental student what the medical college is to the medical student.

We have the Baltimore College of Dental Surgery, the noble pioneer school in this important department of the surgical art, the Ohio College, the Pennsylvania and the Philadelphia Colleges; and I have been informed that the dentists of New York have recently asked the Legislature of that State to incorporate a college of dental surgery in New York.

These institutions have, since the period of their origin, steadily pursued a career of usefulness, and have achieved a commanding position, and established an eminently high reputation throughout the scientific world. Our dental colleges are no longer an *experiment*; they have become a *necessity* to our profession.

In advocating the collegiate system as necessary to the thorough professional education of dentists, let no one think for a moment that I would speak or reflect in any way disparagingly of my professional brethren who have never availed themselves of the advantages of the instruction and discipline of a dental or medical college. I know of many such whom I esteem as practitioners of skill and high attainments; men who have done honor to the profession; men, whose abilities, both natural and acquired, would adorn and ennoble any profession. I would rather speak of many of them in terms of commendation and admiration for the energy and perseverance which they have displayed in acquiring and accomplishing so much, and for having worked their way up to positions of eminence in the profession without the aid of a collegiate course of instruction. But this only proves that these men possessed resolute and energetic minds, capable of grappling with, and overcoming great difficulties. And they are entitled to much praise for the enviable distinction to which they have attained.

Many of our most honored dentists and preceptors were in the profession before a dental college was in existence, and a large number of them are regular graduates of medical universities.

It is now generally conceded that the private pupilage, under a preceptor connected with a collegiate course, affords the best means of obtaining a full dental education. Our dental colleges do not undervalue the preparatory study and instructions of private preceptorship, but, on the contrary, they advocate and require it, and you are all aware that one of the conditions of graduation is, that the candidate shall have studied under a private preceptor at least two years, including his course of instruction at the college.

In my judgment we should, as members of this Association, earnestly desiring to promote the welfare of the profession and advance its interest, do all that we can to influence and induce those about to enter the profession, to attend our colleges of dentistry, in connection with their office tuition, under a preceptor.

Let us not consent to take students for a less term than two years—which is the time designated by the dental colleges—unless they shall have studied dentistry with some other practitioner a sufficient length of time, so as to make their term of pupilage equal to two years; and let us advise them, by all means, to avail themselves of the collegiate course, and graduate as Doctors of Dental Surgery.

The following resolutions were unanimously passed at the last Annual Meeting of the American Dental Association, held in July, 1864:—

"Whereas, in the opinion of the American Dental Association, not less than two years of pupilage in the office of a competent dentist, and attendance upon two full courses of lectures in a dental college, is necessary to qualify a student to practice dentistry properly; therefore

"Resolved, That practitioners of dentistry be requested not to take students for a less term than two years, and, under no consideration, unless they agree to attend lectures and graduate from a dental college, before they enter upon the practice of their profession; and that the people should demand of all those who hereafter enter upon the practice of dentistry that they shall hold a diploma from a dental college as the first requisite to public confidence and patronage."

Similar resolutions were passed at the last meeting of the American Dental Convention, held in August, 1864. We see by this what the profession now considers as the standard of qualifications for persons to commence the practice of dentistry. Some of our State and local associations have passed similar resolutions, and I hope that the Massachusetts Dental Association will soon do likewise.

To dentists who have been in practice for some years, but who have never attended a dental college, I think these institutions offer, to those who are actuated by an honorable ambition, valuable inducements, as in

their conditions of graduation they consider five years' practice in dentistry, inclusive of the term of pupilage, equivalent to the first course of lectures; so that if the candidate shall make suitable proficiency during one course of lectures, he can graduate with the degree of the college. And it affords me pleasure to say that some of the members of this Association have already availed themselves of this privilege, and had conferred upon them last spring the degree of Doctor of Dental Surgery, and received the diploma of the college.

This, in my judgment, is a very commendable plan for any dentist to pursue, and especially for the younger practitioners, and would well repay them for the outlay of time and money required to attend one or two of the annual courses in one of these institutions. Their future usefulness, reputation, and practice would be greatly augmented thereby; besides, the dental colleges would receive the encouragement due them, and the profession would be advanced.

I have said that dental colleges have become a necessary institution of our profession.

Some individuals may deny this averment, though I trust that at this advanced stage of dental progress they are but few, yet if there are any such, I would say to them, in the language of one of our most eminent dentists, "Strike our dental colleges out of existence, and you place our art back far behind the years of its most successful progress—worse still, you doom it to a singleness, a feebleness of purpose and undeveloping apathy, a blind and jealous conservatism, from which no time could redeem it."

The practice of dentistry is every day assuming more importance in the public mind, and it is destined to be elevated to higher usefulness than it has ever yet attained, and this can be effected only by a more thorough education of its operators. We should take the highest ground for the future honor of the profession, and should bear in mind that the practicing dentists of to-day, and the honored professors of the colleges of dental surgery, are the educators of the future profession. Let us endeavor to fill its ranks with educated men.

Dental science is advancing favorably in England, France, Germany, and other portions of Europe, and in our own country, as I have before said, it is making rapid progress.

As has been significantly expressed by an esteemed member of our profession, "Science and art, the twin sisters who so beautifully and harmoniously blend their characters and attributes in our calling, are ever growing, ever moving, ever adding to their already full stature and lofty proportions; ever traveling onward and upward toward perfection. The achievements of to-day are but the finger-posts that point to the discoveries of to-morrow; the triumphs of to-morrow will reveal some hidden truth, or develop some richer treasure for its successor."

Let us continue to have associated effort and united action, let us

labor earnestly and contribute liberally of our ability and means, and do all that we can in our day and generation to elevate and adorn the noble profession of our choice.

PROFESSIONAL EDUCATION.

BY JAS. E. GARRETSON, M.D.

It has been so long a time since I have enjoyed the pleasure of any direct communication with my many friends of the profession, that, in taking up the pen, it is with a feeling which, I conceive, must be somewhat akin to that felt by the wanderer, who, after long years of absence, takes up his wallet and staff for the home journey.

Many years ago—it seems a very long time—I wrote—and with a modesty, at the time, quite genuine—under an assumed name, an article for the old *Dental News Letter*, with the caption of that which heads the present one; it was the first article on a professional topic I had ever written, and it had the peculiar merit of being the very outspokenings of a heart, whose single idea was, that its owner belonged to a profession, noble, useful, and honorable, destined to occupy a high place, and worthy so to be elevated; a profession, whose other name might be called humanity—whose ambition was high usefulness. With the last word written, I could not help falling off into reverie concerning professional episodes passed through in the years intervening between that first article and this present one. The many interesting meetings, for example, of the old time-honored Pennsylvania Association, with its strength and its weaknesses; learned dissertations on plugging teeth; the thousand-and-one strings of the subject struck and struck, until in very weariness music could be gotten from them no longer. The long essays on alveolar abscess—changes rung and re-rung, until each devoted drop of pus must surely have its special historian. Amalgam, with its bright beginning and black end; truths and falsities, conceptions and misconceptions; bright faces and enthusiastic tongues, cynical sneerers, and revilers of the progressive. How much of pleasure and profit I owe to that old Association I hope I shall never forget. Many a rose have I had from its rich clusters, and many a sharp thorn has it produced for my pricking. Grown wiser from wider intercourse with the world, I can now but often smile at our earnestness over little things—not forgetting, however, the strong words and the wise teachings—and wonder how a gum-boil should have commanded words of such “learned length and thundering sound,” or how the filling of a tooth should have provoked such volumes of discussion; and in this wonderment, surely, I cannot be singular. We have all grown so much since then; we were boys then. We are coming now apace to manhood—moving on from sphere to sphere, as our transcendental friends would have it. And yet, at this time, how learned I

thought these discussions! And were they not learned? Truly so to us, who participated in them, or else could we never have commanded the interest which allowed us so often to view and review them. In science, I think, we must all have been beginners; it makes one feel as if he had grown up with the profession.

Here in very association I am brought back to the subject-matter which has, to-night, called my mind to things of the past and things of the present, as they associate themselves with the history and advance of dentistry, and upon which subject I am moved, from the profound love and regard I have for the profession, and for the many who are in it, or may come into it, to offer some observations which the occupancy of a good stand-point of view may make not unworthy of consideration.

I may premise that this article has been elicited, and is designed to find fault with views extracted from a late number of a London journal, and favorably commented on by my old friend, Dr. Buckingham, in an article published in the excellent journal of which he is a co-editor.

The extract is as follows:—

—“Considering that only a few years have passed since the practitioners of Dental Surgery commenced their praiseworthy efforts to elevate the standard of the profession, it is surprising that so much has been accomplished in England. The first agitation, the following separation, and final union of active members of our calling have actually produced a state of things in advance of any country in the world, not excepting America. In the latter country, it is true, a curriculum of study had been marked out for the aspirant to professional distinction for a period many years anterior to the Dental movement in Great Britain; *but, with every desire to give credit to the examinations of the several licensed Dental Colleges in America, we fear that the number of these institutions tends to thwart the very object for which they were established, and that, in consequence, the standard of professional education is tending downward rather than upward. Competition is all very well up to a certain point, but in the matter of Dental Colleges in America it is carried to excess; and the legalized institution offering easy means toward obtaining the D. D. S. degree is more likely to obtain candidates than one which confers the same degree at greater cost of time, trouble, and expense.* Nevertheless, the Profession in America is justly entitled to praise for the spirit it has long possessed, and still possesses; and we trust a like spirit will permeate the British dentists; but, having deliberately acknowledged the College of Surgeons as our head, we cannot but feel that there is greater security than if there were a chance of competition in examinations in so small, comparatively speaking, a body as ours. It was either one thing or another—a single independent college or a union with the College of Surgeons. The Profession, after ample opportunity of discussion, chose the latter; and to it let us loyally adhere.”

"Is the standard of dental education tending downward rather than upward?" Upon this pertinent question, my old friend proceeds to argue the downward side of the question, and attributes the whole depressing tendency, as his remarks too evidently show, to the establishment of a second dental college in the same city with an old one. Now, from my heart, I was most sorry to read these comments from my friend, because, from what I had of late been seeing of dental students, I had felt well satisfied that the profession was coming well, trace in trace, with its sister medicine. Indeed, with my class of last winter I used not unfrequently to urge the halting energies of the medical portion by citing examples of marked and noticeable progress making by our dental gentlemen, and I am free to say that the earnestness and ability of the dental portion of my class never has been surpassed by any medical students in whose surgical education I have had the pleasure to assist.

In the establishment of a second dental college in this City of Philadelphia I had somewhat to do—that is to say, I exerted any little influence which I could bring to bear upon the success of the enterprise; and from what I have seen of the students of this second college, and my intercourse with them as a teacher has been pretty extensive, I must say that the tree is bearing fruit entirely satisfactory.

And now my friend will let me ask him how this could be otherwise, granting that teachers are honest and earnest workers? Does not competition—if such a word might be used in such a connection—provoke to energy and earnestness? Is it not human nature for a new faculty to exert itself to the eclipsing of the old? and does not, or should not, the same nature prompt the old to the maintenance of a supposed supremacy? and does not such happy antagonisms—where the material is good—work to the elevation of all concerned?

Things find their level. If the Pennsylvania College has grounds for complaint, it can—I am sure, from what I know of the various parties—be found only in a higher vitality of the new school. If the school has not the inherent force to occupy the same advanced platform, it must succumb to its healthier and younger rival, just as in turn that rival must give way, if, year by year, its curriculum is not increased, just as now the University or Jefferson schools are compelled to bear favorable or damaging criticism, as one or the other excels in certain departments; and just, indeed, as all the Philadelphia medical schools are, at this moment, having their proud prerogatives shaken by the establishment of a higher order of school in the Hospital Colleges of New York. And is not this the natural law by which the higher development takes the place of the weaker? and does not this law work for the good of the world? And if in such good work you or I should stand in the way, what matters our destruction or removal—what are we? In advocating the establishment of a second college, I took the ground that one must assist the other.

From the scientific stand-point—this, with all deference to the judgment of my friend—has already proved itself to be the case. Such dental lectures as were delivered in this city during the past winter, I am well satisfied never have been heard here before, and they will be still better the coming winter; and so I prophesy they must go on improving until the course of a dental college will, in every respect, be coextensive with that of the medical schools. And this will be the ultimatum of dental teaching; for then will have been arrived at the simple but as yet generally unrecognized fact that the proper study of dentistry is the study of medicine.

And now, as the matter of a pecuniary consideration is involved, do not the people wanting goods go where is to be found the best assortment? and are students unlike all other people that they should not profit on the same principle? When the dental colleges of Philadelphia make known fully the attractions and advantages, which, like the polished jewel, must be the result of their mutual attritions, must it not invite the student from the North and the South, the East and the West? for where will they find such polish, where such worth? Can my friend be so misinformed as to seriously say that such attrition has not mutually benefited the two medical colleges of this city? I may be supposed to know somewhat more of these schools and their teachers than himself; and I give it as my candid conviction, that this attrition is the very life and salvation of both of them, and without it they would die from inanition.

A very common question asked me at the commencement of the various sessions by students is, "What college would you advise me to attend?" and my advice invariably has been, "Go listen to the various teachers for yourselves, and attend that school in which you feel you can be the most benefited." Of the two dental schools of the city, I have frequently been asked the same question, and I have had but the same answer, and were I asked such a question a thousand times over I could have no other answer; for thus injustice, or ill judgment, or prejudice, is denied all influence, and schools make or unmake themselves. So, it has ever been my impression, schools should be left alone by the preceptor. I would not recommend my own brother, if satisfied somebody else might teach my student better—neither would I incline to speak the good word for that other—I should argue that if a student, hearing both teachers or both faculties, could not for himself judge of a difference, his calibre would render it of little concern into which hands he fell. With this whole responsibility thrown on a faculty, having no help, but what of itself attracting, keeps, namely, solid merit, we compound for teachers their only true *elixir vitæ*, as well do we gain for the profession represented, advance and elevation; and not, as my friend would imply, deterioration and decline. I cannot conceive of a man, or faculty, having such little

common sense as to attempt, in such combat, the defeat of an antagonist by soiling that integrity which is his, or their, very stock in trade; so such a question need not be argued.

A word here as to the misconception labored under by our English neighbor; he evidently does not understand the American manner of doing things. We never level down in this country; we are always at work on the up grade. "Level up! Level up!" is the motto of the American people. He must read little indeed if the motto has not a thousand times met his observation. If his uncomplimentary remarks are meant to be restricted to dental faculties, I may say, taking up the gauntlet for those I intimately know, that he may dismiss all fear; a moral responsibility is here the governing principle.

Can it be that in England, as he would lead us to infer, a professional man may obtain a degree without qualification? I could not be made to believe so bad a thing of any faculty. Let no man be so weak as to suppose he will graduate the easier in Philadelphia because of its two colleges; on the contrary, the two must make it just so much the harder; and of necessity make it so. Though, as for that, how pitiable and ignorant must be that man who sets a store by an easy graduation! What would he be spending his time, his money, and his conscience for? A dazzling parchment—whose sole office would be constantly to flaunt in every patient's eyes, his name, with the three ugly letters, ASS, under it. How I wish I might tell to every young man, designing to enter the dental profession, my experience in knowledge-getting! Surely I could teach such that it is not the parchment, but what the parchment means, that constitutes the diploma.

A professional life is a glorious life! It is a happy thing to live to do good; but how unenviable must be the condition of that man who enters on duties for the discharge of which he is unqualified, or professes that which he lacks, the education or experience to practice!

Now, with these feelings and views about what dental colleges were to do, and should do, for our boasted medical metropolis, what must be my mortification, and what, I trust, must be the annoyance of all true lovers of the dental profession, to find a prominent member of one of these faculties throwing down the gage of contention and complaint! A gage, which out of true regard for the two faculties and their prospects, I have stepped in that I might try and take out of the way. I will not believe that such an article was the result of anything else than a fit of the spleen on the part of the writer—regretted perhaps as soon as published—for it is only to believe this, or else, that the school which he represents has weaknesses which it has not the energy to correct, and which it would not have uncovered; and this last supposition I am sure is not true, for in a late visit to the institution, it looked as flourishing as the green bay-tree.

No, no, gentlemen; no fear of clashing interests; do your work as the profession look to you to do it, and there will be enough and more for both to do. Assuming integrity and an honest ambition on the part of the old school, I will take it upon myself to answer for the new, for of a verity, a more perfectly unselfish set of men than composes that faculty I have never met. Energetic and ambitious, their enthusiasm is only surpassed by what has seemed to me the singleness of their love for their profession. I wish them from the bottom of my heart, as I wish the old faculty, a God's speed.

Let the student who designs making choice of dentistry as a profession, consider, when he starts out on his career of study, the advantages which his winters of collegiate life can give him in Philadelphia. Let him recognize the benefits to be derived through her hospitals, her clinics, her hundred avenues of instruction; and making choice of such place of study, let him do as I would do concerning the selection of a college, try all and hold fast to that which he finds best; let him attend, for at least two or three weeks, the different lectures; this is his privilege, and understanding for himself, matriculate accordingly; this is the course pursued by all well-informed students. It is the only course not apt to be attended with regret.

I close with the sincere hope that the profession may never have less cause to be proud of its teachers than at present—with as sincere a hope that these teachers may go on nobly, manfully, and energetically in their truly great and good work; with equal regard and good wishes for the members of both the faculties in this city; and with a last wish that no one may feel it incumbent on him to make any reply to this friendly meant article, or to further agitate the subject.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK SOCIETY OF DENTAL SURGEONS.

BY WM. C. HORNE.

January 4, 1865.

Subject—PERIDONTAL INFLAMMATION.

DR. ATKINSON said that inflammation of the peridental membrane could not exist alone; the local disturbance must be but the display at a weak point of constitutional derangement. He did not consider the number of teeth treated now and twenty-five years ago for this particular trouble a gauge of the progress made in the profession in other respects. He had seen teeth filled by Hudson, fifty years ago, and treated for peridental inflammation without removing the plugs. This disorder is always the forerunner of alveolar abscess. It is most frequent in bilious persons,

and with dead teeth. The local inflammation may be subdued by nausea, or by a warm or steam bath, or a purge; either of which acts by unloading the capillaries. The periodontal membrane never dies till the bone dies. The proper treatment is to open into the abscess, clean out the cavity, and fill and treat the abscess from without; at the same time the patient's bowels should be kept open.

Dr. Castle believed there was nothing constitutional about periostitis; it was nothing but an inflammation of this most tender membrane, which, becoming thickened, raised the tooth up. He applies leeches, and cauterizes the gum with lunar caustic; where suppuration has occurred, he removes the tooth.

Dr. Fitch regards all disease as a perversion of nutritive functions; all impressions, dynamical or mechanical, act on these functions,—the causes being twofold, local and constitutional. In the first stages of the disorder, he would endeavor to subdue inflammation by local treatment; and in the more advanced stages he would resort also to constitutional means of relief.

Dr. Latimer recommended the application of oil of camphor in the cavity of the tooth.

Dr. Castle referred to three classes of teeth which were beyond salvation, where the apex of the root had been destroyed by abscess, and another where the crowns are worn down, and the pulp almost exposed, the acids of the mouth and the air causing great pain; also in cases of retrocession of the gums and periosteum. He controverted the theory of diseased action, using as an illustration the pugilist who is trained to a perfect standard of physical health and strength, and is then bruised and battered by mechanical force locally applied; he could find no constitutional predisposition in such a case. As to controlling the development of the teeth, he was fully convinced by what he saw in his own family that it was utterly impracticable. With both parents of good physical development and strong teeth, he found those of the children very inferior; and he traced back on the mother's side, and found a scrofulous taint in the blood which he found displaying itself in the children of the second and third generation.

Dr. Hurd looked on theory as an important thing, and liked to hear a man support his own theory; if it is correct he can practice on it; but for all that he would not let a mere theory overrun everything else.

Dr. J. Allen had inserted many pivot teeth, and had felt a degree of confidence in nearly every case; but in dead fangs he always looked for trouble if they were entirely destitute of feeling when pivoted. In such cases, by leaving an open groove at one side of the pivot the patient could drain out, by sucking, an accumulation of matter which might arise. He had no trouble, however, after having extracted the living nerve, but when that is diseased and plugged over, there is sure to be trouble got up afterward.

Dr. Fitch found no pain which was not caused by a nerve being impinged upon; to relieve this the best way is to cut. The denser a filling the more liable is it to conduct impressions; but our business is to plug well and take care of results afterward.

BROOKLYN DENTAL ASSOCIATION.

BY DR. WM. C. HORNE.

February, 8, 22, 1865.

Subject—THE VARIOUS METHODS OF SEPARATING TEETH, AND THEIR ADVANTAGES.

Dr. W. H. Allen said, he had tried all the methods of separating teeth that he had ever heard commended. He now preferred the wedge of hickory or orange wood; sometimes he found it difficult to separate teeth in this way, but in the great majority of cases it was effective. Some patients thought it bad, but the majority preferred it to the longer process. Slow wedging had produced very injurious results; he instanced one case where lasting displacement had occurred. There might be advantages in all methods, but he thought most were to be found in that introduced by Dr. Atkinson. In filling teeth he considered it best generally to restore their original shape, and let them come together, not leaving room for food to come between.

Dr. Mills used the wedge almost entirely, because it allows of separating the teeth and filling them at once; it also protects the plug from moisture during its insertion, and the gum from being cut by the file in finishing. He had never had any serious results after its use, and found that most of his patients prefer it to the slower process. It should be used tenderly, but faithfully. He found it suspended sensitiveness in the dentine.

Dr. Clowes said, he was a great believer in the file, because it gives room to work, and also leaves a space so that the teeth can be picked easily. He preferred to keep the teeth apart; if they were allowed to come together after filling between, they would decay again. If injuries were sustained from filing teeth, they were the result of ignorant or careless manipulation, and the same was true of other dental operations. The enamel of the tooth should not be removed so as to leave any of the dentine exposed, and the filed surface should be left perfectly smooth, however much pains might be necessary to make it so. The wedge was very nice for keeping the gum out of the way, but the sheet rubber of Dr. Barnum does away with all need of that.

Dr. Marvin never left any portion of the dentine exposed, but covered it with gold. He did not wedge much, but used thin rubber for a few days; some patients object to this while others do not. He had not the

heroism to drive the wedge for making space, but used it primarily to secure dryness, and secondarily for space. In filling approximal cavities he preferred to build out so that only a fine finishing file should pass between the plugs, and that without any fear of decay.

Dr. Francis had tried the wedge and had experienced it; he could fancy he felt it still. With very firm teeth, if they were very close together, he introduced a thin piece of rubber for separating, and he would rather wear rubber between his teeth for three months than suffer again what he had in having them wedged apart. He had formerly used the wedge to avoid the moisture of the gums, but Dr. Barnum's rubber sheet was still better; he could not do without it.

Dr. Hurd said in regard to filing, that if the enamel were thick he would take off half of it if necessary, but if thin, he would gain access to the cavity in some other way. A man should not be judged or condemned for his method, because some men's work will always stand well, and that is because it is done well. Dr. Griswold, (now deceased,) who had formerly practiced in his neighborhood, used the file freely, and yet his patients' teeth do well, which was owing to his finishing perfectly whatever he undertook. All we need is to judge what we should do for ourselves, and, having thus decided, give our best efforts to the carrying out of our designs. The wedge should be used chiefly to keep the tooth dry in filling and not mainly for separating; it required kind and discreet managing. He had heard some persons say they would rather lose all their teeth than have them wedged apart.

Dr. W. H. Allen said, he tried every method which looked reasonable, applying to individual cases the one which he judged best at the time, and was in favor of an eclectic practice.

February 22.—Dr. Atkinson said, the wedging of teeth apart, if kept up long enough, would cause the death of the organs implicated, but, if not continued longer than six hours, the tooth would immediately recover. He opposed strongly any means of separating teeth which occupied a longer time, dilating upon the suffering which such treatment caused. The only trouble in the case of the wedge was from inflammation of the gum, which sometimes supervened; the gum should always be dressed with arnica after the wedge is removed.

Dr. Hurd referred to a remark of Dr. Atkinson's that the wedge "invited" the gum upward; and likened it to a man's being kicked out of doors, which he considered the "darndest" invitation to leave he ever did have. The wedge, mallet, and creosote were all good in their place, but very bad out of place. He had seen thousands of teeth saved which never had creosote nearer to them than the dentist's shelf.

Dr. Mills spoke in favor of Dr. Atkinson's theory of creosote, his wedges and mallet; after an acquaintance with them of over two years he liked them better than ever.

Dr. Fitch said, there was no telling of the polarizing influences of wedges; he considered the wooden wedge driven by the mallet the very best means of separating the teeth, whether incisors or molars; he never allowed a patient to leave the office with a wedge of any kind between the teeth; the use of rubber for separating was most villainous. He had seen serious consequences caused by this practice, which was a fruitful cause of inflammation, besides the great suffering which the victim had to undergo. No such sufferings or subsequent ill effects were caused by the wedge; it was as merciful as efficacious, and very few who had experienced both methods failed to give the preference to the speedier.

Dr. Marvin had to confess himself a villain, for he used rubber; he also used the wedge. He combated the idea of any man setting up his idea as an inflexible rule for others. He regulated teeth sometimes, moving them gradually for months, and if teeth should not be moved apart gradually for the purpose of filling them, neither should they be for regulating; the "ill effects" which are said to follow the former ought more certainly to follow the latter more extensive displacement. And yet the gentlemen who denounced the slow process in the one case, had no scruple whatever in applying it in its most aggravated form in the other; their theory was sufficiently refuted by their practice.

March 15, 1865.

Subject—TOOTHACHE.

Dr. Hurd read a paper which was requested for publication in full.

Dr. Latimer mentioned a case of toothache that was to him of some interest. The patient was some forty years of age, unmarried, and in delicate health. A few weeks ago she had a violent toothache, which, after a few hours, was suddenly exchanged for a gouty pain in one of her great toes. Yesterday he was sent for by her to remove a loose superior second bicuspid; she had been afflicted with a severe pain in her breast, which was suddenly transferred to the tooth named, and resulting in alveolar abscess. In the first instance, the toe and foot remained swollen and sore for several days. He every day saw cases which show the necessity of being able to discover the occult causes of disease.

Dr. F. Abbott narrated one or two cases of what he termed "painless dentistry." The first, that of a Philadelphian, who was quite sure something was the matter but not clear what. On examination, six teeth in the upper jaw were found to have been filled, of which number the pulps of five were dead; while three had abscesses at the roots. The fillings were so soft that he could run a fine instrument through them to the bottom of the cavity at any point. All this in a mouth which had been put in "perfect order" three years ago. On removing the filling from three of the dead teeth, no opening was found into the pulp chambers,

but on cutting into and cleansing them, the patient observed that, "judging from the effluvia," he had found the difficulty.

His treatment of teeth found in this condition is, after cleansing satisfactorily, to apply, by means of a fine broach with a very little cotton wound on the end of it, the solution of iodine and creosote through the tooth to the apex of each fang, or until the patient feels the instrument. After removing this, a small pellet of cotton moistened with creosote is left in each fang. In the present case, after the lapse of eight days, the abscesses were all healed, and the teeth in so good a condition that the mallet could be used on them freely without any inconvenience to the patient. He had had far better success in treating alveolar abscess through the fangs than in operating through the gum and alveolus. The second case was that of a boy, ten years of age, who had had a tooth filled over an exposed pulp with the intention of preserving it alive. When first seen he was in great pain, the face badly swollen; he had not slept the night before. On removing a portion of the filling, pus exuded from the pulp cavity, and the pain almost immediately ceased. With the same treatment as in the first case the tooth was made healthy and serviceable.

Dr. C. P. Fitch said, there is a class of very interesting cases of toothache. Their cause was somewhat shrouded in mystery, and to make the proper diagnosis, required knowledge and experience, and a minute history of the case. The difficulty of making a correct diagnosis in such cases arises from the fact that a remote lesion, acting through the ganglionic or sympathetic system of nerves and the compound nerves, whose functions are both motor and sensitive, may be the cause of pain in a tooth.

Hence a knowledge of the origin and complex distribution of such nerves was highly essential to successful treatment, and the primary treatment in all such cases was the suspension or amputation of nerve force to such a tooth or teeth. In ordinary cases the cause of toothache was apparent, and the treatment quite plain. Periostitis is not unfrequently produced by such remote occult causes, but such distorted conditions were very controllable by holding in abeyance the nervous force until the normal function of the part was re-established. The doctor related some instructive experience in reference to personal suffering caused by the death of a pulp from thermal changes, inducing acute periostitis; the disorder yielded, however, after two days' constitutional treatment.

Dr. C. S. Francis referred to the importance of saving the pulps of teeth, which he always did if possible; deeming a living tooth far preferable to a dead one. He cited a case of personal experience, stating that while having a tooth prepared for plugging, the dentine was so exceedingly sensitive as to cause severe toothache, which continued most of the time for two or three weeks. The pulp appeared to be much irritated,

and several times he was on the point of having the pulp cavity opened, but determined to make additional efforts to save it. The usual remedies were severally and repeatedly tried with little benefit; finally a heroic dose of creosote and tannin was applied, and covered with a concave silver cap, over this a Bevin's filling was introduced, and the pain gradually subsided. The pulp is still alive and in good order.

Dr. W. H. Atkinson, adverting to Dr. Hurd's paper, said that it justly criticised Dr. Harris' definition of "Toothache," which amounts to the clownish conclusion that pain is pain. Still this was a good beginning from which to develop the apprehension of that mysterious modification of natural circulation which we call by many unpleasant, sometimes derivative, epithets. To him who possesses the cultured powers to understand the actions of living bodies, primary or *direct*, or secondary or *reflected*, this simple monosyllable, *pain*, completely pronounces that peculiar action, the apprehension of which is alone comprehended by experiencing its unwelcome presence in our own personality. There is, therefore, no standard universally applicable by which to define in words alone this occult mode of disturbance of nutrient activity. Toothache is no more nor less than *pain* in a *tooth*; this may be located in the pulp or in the peridontium, separately or in combination. Derangement in quality of the neural or vascular bloods, one or both, always precedes and accompanies pain, which is nothing but the cognizance of this derangement.

There is something very mysterious in the power of the will as to location, intensity, or continuance of pain. Those of persistent will-force are able to put forth the mandate to the unwelcome visitor with such positiveness as to allay it at once, or at most after repeating the effort a few times, while those who give way to depressing fears at the first advent of sharp suffering are likely to be completely unmanned, and actually become the subjects of derangements to a fearful extent, or destruction of the parts involved. The difference between him who says, in effective tone, "Down" to the disease, and him who falls prostrate before the first charge of its forces, is simply in the make up of the individual, whether original or acquired.

CHICAGO DENTAL SOCIETY.

THE annual meeting of the Chicago Dental Society was held April 7th, Dr. Geo. H. Cushing, President *pro tem*.

Members present: Drs. J. W. Ellis, J. D. Quinlan, J. C. Fuller, J. C. Dean, S. B. Noble, A. J. Harris, William Albaugh, W. A. Stevens, B. M. Baker, and J. Deschauer.

The following gentlemen were elected officers for the ensuing year: *President*, Dr. Geo. H. Cushing; *Vice-Presidents*, Drs. J. W. Ellis, and J. C. Fuller; *Corresponding and Recording Secretary*, J. C. Dean;

Treasurer, Dr. S. B. Noble; *Librarian*, Dr. W. A. Stevens; *Executive Committee*, Drs. J. H. Young, William Albaugh, and A. J. Harris.

A vote of thanks was passed for the excellent paper by Dr. Ellis, on Alveolar Abscess, read at the last meeting; and Dr. J. C. Dean was appointed essayist for the next meeting, first Monday in May.

Voted that the Secretary draw an order on the Treasurer for fifty dollars, and the same be transmitted to the Treasurer of the Dentists' Protective Association of Boston; and that another equal amount be subject to their order when this Society is properly informed of its necessity.

The meeting was a very pleasant one, and it was unanimously conceded that the Society had made good progress during the first year, just past.

J. C. DEAN, *Secretary*.

BALTIMORE COLLEGE OF DENTAL SURGERY.

THE twenty-fifth annual commencement of the Baltimore College of Dental Surgery was held at Baltimore, March 3, 1865.

The valedictory was delivered by Prof. Austen.

The degree of D.D.S. was conferred on the following gentlemen:—William Thomas Arnold, Maryland; Charles Henry Daly, Cuba; Meredith Dairs, M.D., Maryland; Jose Calasaus de Escalada, Cuba; Charles Edward Kloeber, Virginia; Johannes Paetsch, M.D., Prussia; Albert Price, Maryland; Joseph Robinson, Maryland; Van Buren Stevens, Indiana; Reginald Heber Trader, Maryland; Thomas Sollers Waters, Maryland.

EDITORIAL.

AMALGAM AND METALLIC COMPOUNDS FOR PLUGGING TEETH.

WE did expect long since to cease speaking about these substances for filling teeth; but the times and the public welfare seem to demand of us a constant reference to them, or from the extensive manner in which they are employed, it might be inferred that all objection to them had ceased. It will not be denied that the original opponents of amalgam and metallic compounds were among the most distinguished and intelligent members of our profession, and it was hoped that with the increase of intelligence and education in our profession, the use of those substances would diminish. But this does not seem to be the case; it appears that ingenuity and education have only been turned to modify the vile substances, to clothe them in new dresses to escape the odium attached to the old names. Washing in alcohol did not purify the unclean thing, nor the addition of cadmium stop discoloration, poison, and corrosion. We said

also, on a former occasion, that we did not care what any other dentist did, or what he used, if the patient and he were both satisfied. This assertion we must retract; it is demanded of us by the patients who have been deceived into the use of those substances by dentists in whom they had put their trust; and it is demanded of us by the profession, which we consider as our duty to do all that lies in our power to hold above reproach. The high price of gold has doubtless been a cause of the use and much of the abuse of those articles. The exorbitant charge made by many dentists upon their patients in case gold were to be employed, and the assurance that the compounds and amalgams were as good, and in many cases better than gold, induced patients who knew no better than to adopt the suggestion of their dentists. Patients are not to be blamed, in these times of high rates, if they study economy even with reference to the operations upon their teeth. As a general rule, the dentist who employs these substances tells the patients that their teeth cannot be plugged with gold. We would find no fault with inexperience or want of skill, if men had the courage to say *they* could not plug such cases with gold; we have sufficient proof that this last excuse for their use is false, and the facts are these:—

In the last two months, we have removed forty-eight amalgam and metallic compounds, the aggregate weight of which is twelve dwt. eighteen grs.; much of the substance of some of the plugs was lost by cutting and drilling during their removal. In nearly all of those cases the teeth had decayed under and around the plugs; many seemed to have been put in over the decay, and especially when the teeth were tender at the time—that was also often advanced as an excuse for the use of “soft filling.” All of these cases have been filled with gold, without breaking the teeth or inflicting undue pain on the patient. Several of those cases had the cadmium filling, and the bone of the teeth was soft and yellow, and could be cut away to an indefinite extent. Any compound or amalgam containing cadmium is perhaps the most destructive in use; the distinguished Evans, of Paris, was perhaps the first to introduce it, and perhaps the first to abandon it on account of its destructive qualities to the tooth bone.

J. D. W.

OBITUARY.

DIED in Lowell, Mass., April 19, of congestion of the lungs, DR. WILLIAM D. VINAL, aged fifty-four years and eleven months.

He had been a practitioner of dentistry in that city for nearly twenty years.

At a meeting of the dentists of Lowell, the following resolutions of respect were adopted:—

Whereas, it has pleased the Overruling Providence to remove from our midst Dr. William D. Vinal, therefore

Resolved, That by his death the dental profession has lost a conscientious and worthy member, and Lowell an exemplary and upright citizen.

Resolved, That while we sympathize with his family and friends in this their sad affliction, we rejoice that they have the consolation of knowing that he had the Christian's hope of a glorious immortality.

Resolved, That a copy of these resolutions be tendered to the family of the deceased, and also published in the papers of the city, and in the various dental journals.

A. LAWRENCE, *Chairman*.

G. A. GERRY, *Secretary*.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

DR. GEO. WATTS' RETIREMENT FROM THE EDITORSHIP OF THE DENTAL REGISTER OF THE WEST.—It is peculiarly unfortunate, at a period when the profession is greatly in need of the services of the most matured minds and varied talents which it can command, that one whose capacities have been so well tested should feel compelled to lay down his pen with the expectation of never again employing it in a direction which has heretofore proved so beneficial to his fellows and pleasant to himself. For there is a pleasure in such work as that in which he has been engaged. Chained to the ground by material wants, men are ever found too ready to forget the privilege which they enjoy, and the duty they owe their fellow-beings, to endeavor to contribute their share to the hereditary aggregate of knowledge; happy in a respite from severe toil and bitter contention, and well content with easy pleasures which cost little exertion to procure and none to enjoy, this exalted privilege is too often neglected even by those whose abilities and attainments eminently fit them for engaging in such efforts, and the most robust and vigorous constitutions only, whether of mind or body, apparently find a charm in ardor of pursuit, and feel that inward prompting which excites them to follow out great and good, though frequently distant objects, in defiance of difficulties. Even these for the most part require the stimulus of external sympathy and applause to cheer them on their career; and great indeed and nobly self-dependent are those minds which, unrepressed by difficulties, unbroken by labor, unintimidated by opposition, and unexcited by applause, can find in the working out of a useful purpose or the prosecution of an arduous research, attractions which will lead them to face, endure, and overcome the one, and to dispense with or despise the other.

As an editor of the *Dental Register*, in co-operation with his able coadjutor, Dr. Watt has for nine years labored earnestly, zealously, and effectively for the benefit of the profession, and wielded an influence for good which few members of the profession can claim or expect to enjoy. In everything that related to the best interests of the profession, he has manifested a deep and lively feeling, and has always been found among the first and most powerful in lending his influence in support of movements having such objects in view.

The local and national associations in particular have ever found him an earnest and indefatigable worker, and it is to be hoped that, although ceasing to contribute to the literature of the profession, he will still be found taking the same active and prominent part in the deliberations of the societies, which have heretofore characterized him.

In retiring from the position which he has filled so long and so well, he carries with him the best wishes of his friends, among whom the writer of this article takes pleasure in placing himself, fully reciprocating the kind expression of regard and friendship embodied in a private letter received from him some time back. In the past we have sometimes differed in opinion, but these differences have been of the head and not of the heart, and this slight tribute of respect is paid as justly due to one who has labored *earnestly* and *honestly* for the elevation of his profession and the good of his fellow-men.

DICTATION OF PATIENTS.—Although the day has passed when parents, presuming to dictate to the dentist what teeth should be extracted for their children, found the latter, in opposition to his own convictions, with too prompt compliance often ready to obey such behests, it is still not an unusual circumstance, even at the present time, to find persons whose general intelligence should place them above the imputation of such folly, call upon the dentist with their children or send them to him, with instructions that such and such teeth are to be extracted; his services as an operator, not his judgment and experience as a practitioner, being required. That they would not for a moment think of adopting such a course with a physician or surgeon, it requires no argument to prove; and the sooner they are taught the true value of the dental organs, and to respect the opinion, and place confidence in the judgment as well as the skill of the dentist, the better will it be for them and the community in general.

As an illustration in point, a lad twelve years of age called upon me recently, with instructions from his mother, that the right upper molar was to be extracted. On examining the tooth, although the pulp was

found exposed, the decay was by no means sufficiently extended to warrant the proposed operation, and the child was sent back to his mother with that information. Subsequently the parent called with him, and said that, although the tooth no doubt could be saved, she desired that it should be removed, along with the other anterior molars which were somewhat decayed, as she feared that if allowed to remain, they would crowd the other teeth and cause them to decay. In response to this, she was told that if any such operation was to be performed for her son, she would have to secure the services of some one else to do it, as I would not consent to extract any tooth which could be saved, and that such an operation, as a matter of principle, would be as unjustifiable as the extirpation of an eye, or the amputation of a limb, because happening to be diseased, the patient or friends made the request; with regard to the retention of these teeth proving detrimental to the others on account of crowding, she need have no apprehensions on that score, for the Creator, in placing them there, was a better judge of the present and future demands of the economy than man could pretend to be; that the arguments in support of the plan she favored were specious, and had no foundation in fact; and lastly, that the teeth, in their relations to mastication, speech, and appearance, demanded that every effort should be put forth to save them: the operations would be expensive, but the benefit to be derived would fully compensate for the expenditure. The opinions thus presented had the proper effect, and the patient was placed under my care, with the request to do what I believed to be *right*.

THE DENTAL REGISTER OF THE WEST—DECEMBER.

“STEAM PRESSURE IN VULCANIZERS. Read before the Massachusetts Dental Association, January 2, 1865. By A. LAWRENCE.—In the hope that a few ‘practical hints’ upon the subject of steam, as applied in the vulcanizing process, may be acceptable to the profession, I will endeavor to give them.

“I may premise by suggesting that although the dental profession are not expected to turn engineers, *en masse*, yet not only they, but all others who attempt to generate steam at high pressures, should do so with a full knowledge of the agent which they are producing. Presuming dentists to be uninformed upon this subject, does not, necessarily, imply a want of professional education, for until within a few years there has been no necessity for research, or even a thought, in this direction.

“The introduction of vulcanite, however, has not only revolutionized mechanical dentistry, but compelled us to use steam, whether familiar with it or not; and vulcanizing is now done daily at a required pressure doubly sufficient to propel the largest steamship afloat.

“It may be inferred from what has thus far been advanced, that we have to deal with a monster whose persistent efforts for liberty can be held in check only by the strongest prison walls, and the utmost vigilance.

"To the further consideration of the subject, it becomes important to inquire whether the vulcanizers now most in use are sufficiently strong to resist the force applied. From experiments made at the Franklin Institute, it was found that the tensile strength of wrought copper, one inch square, at a temperature of 302° is 30,872 lbs., and at 392° only 27,154 lbs. Now it will be found, by mathematical calculation, that at 320° , the usual vulcanizing point, it is about 30,000 lbs.

"The published tables, however, give 34,000 lbs. as the tensile strength of wrought copper, but it must be borne in mind that the latter figures are based upon experiments at a much lower temperature than that under consideration. Most vulcanizers are now made of sheet copper one-sixteenth of an inch in thickness, and, agreeable to the foregoing facts, have a tensile strength of 1875 lbs.; and one four inches in diameter will not sustain a pressure of more than 150 lbs. per square inch, or a temperature of 363° .

"Let us next ascertain what force of steam is exerted upon the boiler within a short range of temperatures. We find by the tables of Haswell, King and others, that at 320° the pressure is 85 lbs., at 324° 90 lbs., at 328° 95 lbs., and at 332° it is 100 lbs. per square inch. These figures I have verified by a steam gauge connected with my own vulcanizer, and which I now use in preference to the thermometer, as I consider it more convenient, safer, and less liable to accidents.

"Practical engineers concur in the opinion that a force of not over one-half the sustaining capacity of the boiler can be safely applied.

"Now, then, if vulcanizers of the diameter previously given were made of sheet copper one-eighth of an inch in thickness, they would be capable of sustaining a force of 298 lbs. per square inch, and at the temperatures attained in practice might be regarded as comparatively safe. Of course it must be understood that the thickness of metal should increase with the diameter of the boiler, when designed for a given pressure.

"Having given the statistics, little remains to be said, except, perhaps, to call in question the expediency of jeopardizing our lives every day in the week for the paltry sum necessary to furnish a trifle more metal to our vulcanizers.

"The cost of manufacturing, aside from the stock, would not be enhanced.

"It may be urged that vulcanizer explosions are of very rare occurrence.

"Admitted; but therein consists the wonder, for it is not surprising that a few are 'blown up,' but that more or all are not.

"The vulcanizer is nothing more or less than a small boiler for generating steam; and in its use we should so regard it, for the fact it is small does not deprive it of liability to the same accidents, or some of them at least that larger ones are.

"We recoil with a certain degree of apprehension from the presence of the large marine boiler carrying from 20 to 40 pounds of steam, while we sit down before the small vulcanizer with as much nonchalance as to a cup of old Hyson. The difference is only as between the 100-pound Parrott gun and a pocket pistol.

"Steam is easily managed so long as it is managed, its control being dependent upon certain well-established principles, a departure from which cannot safely be indulged in, unless, indeed, one wishes to enjoy

the extreme felicity of an aerial journey at the expense of all earthly ties.

"However agreeable it might be to others to see their own heads kiting through the air, I must confess that I have no unconquerable desire to participate in any such amusement.

"I do not by any means wish to be regarded as an alarmist, but there is, most certainly, a limit to the resisting capacity of the boilers we use, as is the case with those intended for other purposes.

"Suppose the bulb of the thermometer gets slightly fractured, and the accident not being discovered, the vulcanizer is put to use, what then?

"If the damage is slight, the mercury may still be made to rise in the tube at high temperatures, but will not truly indicate the full heat or force within. Some time ago I had some difficulty in producing a desirable shade in my vulcanite work; it was too dark, as is the case when overheated, and I came to the conclusion that the gum had deteriorated in quality. Other samples of gum were tried, and at varying lengths of time, yet with the same result.

"No defect could be discovered in the thermometer by the naked eye, but a microscope revealed a slight crack in the bulb, and the mystery was solved. But what force of steam was produced during these almost despondent trials?

"Although my vulcanizer would safely bear a pressure of 100 pounds per square inch, I concluded to use a steam gauge for the future, and now feel a security in its use positively refreshing. The gauge I use is that manufactured by the American Steam Gauge Company, No. 44 Exchange Street, Boston.

"Considering the further continuation of these remarks undesirable at this time, I leave the subject to the reflection of any who may think it worth their attention."

PRESERVATION OF THE REMAINS OF EXTINCT SPECIES.—The following extract is from the highly interesting work of *Huxley on the Origin of Species*:—

"Almost all the hard parts of animals—the bones and so on—are composed chiefly of phosphate of lime and carbonate of lime. Some years ago, I had to make an inquiry into the nature of some very curious fossils sent to me from the north of Scotland. Fossils are usually hard bony structures that have become imbedded in the way I have described, and have gradually acquired the nature and solidity of the body with which they are associated; but in this case I had a series of *holes* in some pieces of rock, and nothing else. Those holes, however, had a certain definite shape about them, and when I got a skillful workman to make castings of the interior of these holes, I found that they were the impressions of the joints of a back-bone and of the armor of a great reptile, twelve or more feet long. This great beast had died and got buried in the sand, the sand had gradually hardened over the bones, but remained porous. Water had trickled through it, and that water being probably charged with a superfluity of carbonic acid, had dissolved all the phosphate and carbonate of lime, and the bones themselves had thus decayed and entirely disappeared; but as the sandstone happened to have consolidated by that time,

the precise shape of the bones was retained. If that sandstone had remained soft a little longer, we should have known nothing whatsoever of the existence of the reptile whose bones it had incased.

"How certain it is that a vast number of animals which have existed at one period on this earth have entirely perished, and left no trace whatever of their forms, may be proved to you by other considerations. There are large tracts of sandstone in various parts of the world, in which nobody has yet found anything but footsteps. Not a bone of any description, but an enormous number of traces of footsteps. There is no question about them. There is a whole valley in Connecticut covered with these footsteps, and not a single fragment of the animals which made them have yet been found. Let me mention another case while upon that matter, which is even more surprising than those to which I have yet referred. There is a limestone formation near Oxford, at a place called Stonesfield, which has yielded the remains of certain very interesting mammalian animals, and up to this time, if I recollect rightly, there have been found seven specimens of its lower jaws, and not a bit of anything else, neither limb-bones nor skull, or any part whatever; not a fragment of the whole system! Of course, it would be preposterous to imagine that the beasts had nothing else but a lower jaw! The probability is, as Dr. Buckland showed, as the result of his observations on dead dogs in the River Thames, that the lower jaw, not being secured by very firm ligaments to the bones of the head, and being a weighty affair, would easily be knocked off, or might drop away from the body as it floated in water in a state of decomposition. The jaw would thus be deposited immediately, while the rest of the body would float and drift away altogether, ultimately reaching the sea, and perhaps becoming destroyed. The jaw becomes covered up and preserved in the river silt, and thus it comes that we have such a curious circumstance as that of the lower jaws in the Stonesfield slates. So that, you see, faulty as these layers of stone in the earth's crust are, defective as they necessarily are as a record, the account of contemporaneous vital phenomena presented by them is, by the necessity of the case, infinitely more defective and fragmentary."

DENTAL REGISTER OF THE WEST—FEBRUARY.

"THE USE OF THE FILE. Read before the Iowa State Dental Society, January 4, 1865. By S. TROWBRIDGE.—The file should be used for two purposes in dental operations.

"1st. To remove superficial decay.

"2d. As a preparatory step to filling where the decay has progressed so far that it is not advisable to remove all of the decay by the use of the file.

"The cases where superficial decay is most frequently removed are on the central and lateral incisors and canines.

"For this purpose a flat safe-sided finely cut file is most convenient. The edges of the file for removing decay on the approximal surfaces of the teeth should be beveled so as effectually to prevent any shoulder being formed on the tooth near the margin of the gums; and here we remark that for theoretical, and we believe for practical utility, the handles of these, as well as all separating files, are placed on the wrong end of the file; that is, the files are made to cut pushing from instead of drawing

toward the operator, whereas they should be made to cut toward the operator and not from him.

"The advantage of this will readily be seen from the construction of the dental arch, which is such that a pressure sufficient to cut off a portion of the enamel will tend to diminish the circle of which this is an arc, and the circle thus diminished, the file is grasped firmly between the teeth, causing a disagreeable, if not injurious concussion.

"But were the pressure made so as to enlarge the circle and increase the space between the teeth, the operation could be performed with less liability to injure the teeth, and more agreeably to the patient. So much for the file itself,—now for the results of its use.

"Does it injure the teeth to file them? We answer, yes. It injures them inasmuch as it takes off a part of the covering or enamel which nature has placed there for protection of the more vital parts of the tooth; and as disease in teeth as well as in the general system finds its first hold in the weakest points, we have, seemingly, given it an encouraging commencing place. But, as in the first case, we would use the file only for the removal of actual decay, it becomes a question, not whether filing sound teeth injures them, but whether the removal of the decayed and diseased portion of the tooth, by the use of the file, injures them more than the decay. To this we answer, no; and believe that when thoroughly and properly done, the old adage, 'a stitch in time saves nine,' is much more appropriate than when applied in its literal signification; and it can be thoroughly and properly done by the use of a fine-cut file, and finishing with one that has been worn quite smooth, polishing the surface with a bit of soft wood and flower of emery; or, if between the teeth, with a slip of cloth or chamois skin and flower of emery. But there are very few cases where the dentist is consulted before the case demands a different kind of treatment, and this brings us to the second case, where the file should be used, viz.:—

"In preparation of the cavity for filling, the file is of great service in separating the teeth, and for the approximal cavities of the six interior teeth a flat safe-sided file is preferable, but for the bicuspid and molars a V-shaped file is better adapted to the work, and unless both teeth are decayed, a safe-sided file should be used; for it is not allowable to file and destroy the shape of a sound tooth for the purpose of preserving the shape of the diseased one. The opening should be such as to allow the operator to work with certainty of success, and all projecting and irregular points of the enamel on the margins of the cavity should be removed by a small half-round file, and a firm smooth margin left to fill upon and finish.

"Neglecting to cut away these thin frail portions of the tooth, for fear of showing the filling, is the cause of failure in nine-tenths of the cases of this kind that fail. This is the groundwork, the foundation, upon which the whole structure rests, and unless this be thoroughly performed, with a thorough knowledge of the ground upon which the foundation is laid, as well as the material used in the superstructure, the whole will indeed be built upon the sand and swept away with complete destruction, to the loss of both patient and operator."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"On Nutrition. By LIONEL S. BEALE, M.B., F.R.S., Fellow of the Royal College of Physicians; Physician to King's College Hospital; Professor of Physiology and of Morbid Anatomy in King's College.—Every tissue and every organ of the body, as is well known, is composed of a great number of small elementary parts or cells resembling one another. Moreover, the elementary parts of all tissues of all organisms, although differing from one another in structure, function, properties, and composition, nevertheless possess certain characters and properties in common. All exhibit the phenomena of growth, all form or produce certain peculiar substances, all appropriate certain materials and communicate to them properties or powers which they did not possess before. All are capable of producing new cells.

"Now, a cell or elementary part of a tissue, though it be less than $\frac{1}{1000}$ of an inch in diameter, does not exhibit the same properties and composition throughout, but every living growing cell consists of matter in two very different states: 1, *Matter which is living*; and 2, *matter which has ceased to live*. The living or germinal matter is within, and appears dark and granular in the drawings;* the matter which has lived, or the formed material, is external to the germinal matter, and is indicated by a smooth tint. In the process of development, formation, and decay, the constituent particles of each elementary part or cell pass through certain definite changes, which always occur in the same definite order. In the process of nutrition the nutrient pabulum pursues the same course in all; it becomes changed in the same wonderful manner by the action of the living matter with which it comes into contact. This living matter passes through its various phases of existence like matter which lived before it, and perhaps it is to be followed by new matter, the particles of which will induce similar changes, and follow those which preceded them.

"The nutrition of the monad, of the plant cell, or of the cell of any tissue of man, seems to be conducted upon the same principles. Nutrition cannot be imitated in inanimate matter, and seems to be due to the operation of a wonderful force or agency, of the nature of which we know nothing, save that pre-existing living matter of the same kind manifested similar active phenomena. If, then, we desire to investigate the process of nutrition, and to account for the phenomena which take place in the nutrition of healthy or morbid structures, we must study the process as it occurs in a single component elementary part of a tissue or organ; in fact, *the nutrition of the cell*. When the changes occurring in one single elementary part of the tissue or organ are satisfactorily explained, those which take place in the entire tissue, organ, animal, or man, will soon be understood.

"This wonderful process of nutrition does not consist in the mere deposition of matter which was dissolved in a solution, or crystallization would be a form of nutrition; nor is it an attraction of certain particles

* Omitted.

of matter for particles of a similar kind dissolved in the surrounding fluid, or the formation of a calculus would be due to nutrition. Neither is nutrition a chemical process resulting from the strong affinity of matter of one kind for matter of another kind which is drawn from its state of combination, for if this were so, many chemical operations would be illustrations of the process of nutrition.

"Nutrition involves far more than takes place in these or any other phenomena occurring in inanimate matter. And no one has yet been able to bring about changes in inorganic materials at all resembling those which occur in the nutrition of the simplest living organism in existence. But it has been so frequently and so very confidently affirmed that the tendency of modern scientific discovery is to break down the barrier which it was formerly believed separated things living from things inanimate that some persons regard it as an opinion generally received by scientific men, and justified by observation and experiment, that the difference between the phenomena occurring in the inorganic world and in living beings is a difference of degree rather than a difference of kind. This view rests upon vague general assertions alone, and has as yet no real foundation whatever. Those who entertain such a doctrine should state in what particulars the lowest living form, such as a monad or a microscopic fungus, resembles inorganic matter, and in what particulars it differs from inorganic matter. It is time that earnest, unprejudiced men, who are willing to learn, should be simply told what is really known, and encouraged to inquire further, instead of being overwhelmed with mere high-sounding unsupported assertions, which in many ways retard the advance of true science. Those who have most earnestly and carefully studied the matter well know that many of those wonderful phenomena occurring in healthy and diseased structures cannot be accounted for, unless the operation of some force or power or agency, distinct from ordinary force or energy, is assumed, and it is mere trifling to assert that the tendency of investigation is to prove that vital force is but another mode of simple energy or motion, unless facts are adduced in support of such a view. Some may rest content and cease to inquire further when they are told that the human *machine* resembles a machine made by human hands; but any one who has actually studied even in a superficial manner the structures evolved during the formation of the human machine, the arrangement of a single tissue, the action of a single organ, or even of a single cell, to say nothing of the phenomena occurring during disease, will have seen sufficient to lead him to doubt if there exists any real analogy between man's machinery and the machinery constructed by man, and he naturally asks those who profess to see so much further than he can see to show him in what particulars even a single simple living cell resembles the most perfect machine ever made by human hands.

"The structural forces which lie latent in molten masses, to which crystallization of amorphous drops of matter is due, are one thing, and the 'structural forces' which lie latent in the drop of living matter, and cause the 'crystallization' (!) of matter in the shape of muscles and nerves and other tissues, are another. The 'constructive force' of crystallization which lies latent in the drop of water manifests its activity when heat is abstracted. The 'constructive force' of living matter comes into operation only when heat has been added. Yet it is assumed that in each case the 'constructive force' is a form or mode of heat itself; and although the assumption is unsupported by reason, it passes unquestioned, and is

even regarded by some as a new scientific truth,—as an evidence of our progress toward what is called unity! One would have thought that the differences between crystallization and the production of tissue had been shown often enough and clearly enough already to convince any impartial observer that crystallization, and formation of tissue, were two very different processes; but is it probable that those who have embraced the dogma that the *only* forces operating in nature are derived from the sun can be influenced by argument or reason, or their faith shaken by the results of observation and experiment?

“It has been assumed that the molecular forces of the crystal and the molecular forces of the cell are molecular forces of the same kind acting under different relations or differently conditioned; but we have not been taught in what the relations differ, or what is to be understood by the term ‘conditioned.’ According to some philosophers we might say, Here is a living cell, and there its pabulum. The forces of the latter, originally derived from the sun, become so ‘conditioned’ by the atomic machinery of the cell as to result, in one case, in the formation of a cabbage, in another an oak, and in another a man, and so on! Force may be ‘conditioned’ by machinery made by us so as to set in motion various wonderful instruments; but we know, or may learn, the structure and arrangement of the machinery by which the conditioning is brought about. Before we can understand what is meant by the word ‘conditioned’ as applied to the atomic machinery of the cell, we must be taught something of the structure of its *atomic machinery*; but upon this subject the New Philosophy maintains the most profound silence. It asserts largely, and, as smoothly as confidently, glides with incredible swiftness from one position to another. Why should it pause to explain? Physiologists may ask in what points the living cell resembles the machine made by hands? and the conclusive answer is, that it does!

“If, however, we inquire for ourselves, and examine the living matter in which this conditioning of force goes on, we find in it no evidence of structure at all; there is no *machinery* that we can see. A power of 10,000 diameters reveals no structure whatever, nor can we see any difference in different kinds of the living matter, although the conditioning is so widely different. The conditioning of force by a machine which has been manufactured, the structure of which is well known, must, therefore, be a very different process from the conditioning of force by living matter, the structure, composition, and arrangement of which are unknown. This living matter is all-important to the nutritive process, but it has been ignored by those who consider all the changes to be due to physical force.

“Let us now endeavor to ascertain simply what changes may be proved to occur during the nutrition of a cell. Whether vessels be concerned or not in the mere distribution of the nutriment is of no importance, as vessels have nothing to do with the process of nutrition itself. The thing to be nourished must be composed, at least in part, of living (germinal, protoplasmic, or nucleus) matter,—that is, of matter in a state or condition which, for the time being, differs in its properties, powers, or forces from every other state in which matter is yet known to exist. Formed or lifeless matter *alone* cannot be nourished without the agency of living matter any more than a crystal or a calculus can be *nourished*,—although matter may be *deposited* upon its external surface, or even in its substance.

"If ordinary epithelial particles or cells be examined at different periods of growth, it will be noticed that the relative proportion of the *living matter* to the *formed matter* varies considerably; and from these observations we can form a notion of the changes which occur in one cell as it undergoes development.

"An epithelial cell at first consists of a mass of germinal matter, which was detached from a pre-existing mass, with a very thin layer of soft-formed material around it. This latter continues to increase in the manner I have described in my lectures at the College of Physicians in 1860.*

"In such a simple cell, then, the phenomena of *nutrition, growth, and formation* may be studied.

"In many cases an arrangement as of concentric zones around the mass of germinal matter may be observed. This does not arise from the deposition of layer *upon* or *outside* layer, as in the formation of a calculus, but from the formation of layer *within* layer. This part of the subject has been worked out in other papers, and need not be further discussed here.†

"In nutrition, certain constituents of the pabulum are not changed or altered, or modified by the action of the nucleus or cell wall, as is generally taught; but certain of the very constituents of the pabulum actually become the germinal matter, and this latter becomes resolved into formed material, which is added to that previously produced or compensates for what is removed by decay.

"The process of nutrition consists of—1. The passage of the pabulum through the formed material when it reaches the germinal matter. 2. The conversion of some of its constituents into germinal matter. 3. The conversion of some of the germinal matter previously existing into formed material which is deposited layer within layer, as it were, upon the *inner surface* of the formed material already produced. In many cases the successive layers are incorporated with one another.

"The process of *oxidation* probably affects the outer and oldest part of the formed material chiefly, and, in some instances, occurs in this situation only.

"Nutrition, therefore, comprehends the appropriation of inanimate nutrient matter by living matter *which already exists*; the conversion of the nutrient matter into living matter, and the latter into formed matter, which may increase that which has been already produced, (growth of formed material,) or may compensate for that which has been destroyed or removed, (maintenance.)

"The process of nutrition may be divided into three stages:—

"*First Stage of Nutrition.*—(a) The passage of pabulum in solution through the formed material. (b) Its contact with the living matter.

"*Second Stage of Nutrition.*—The conversion of certain constituents of the inanimate pabulum into active living matter.

"*Third Stage of Nutrition.*—The conversion of living matter into inanimate formed material.

"It appears that the first stage of the process of nutrition of a cell or

* See also "Structure, Growth, and Life," p. 27; "How to Work with the Microscope," third edition, p. 225, and papers in the *Archives of Medicine and Microscopical Journal*.

† "Structure, Growth," etc., p. 17.

elementary part comprehends, (a), The passage of the dissolved pabulum through the formed material already produced, and (b), The contact of the solution which has passed through with the living matter. Up to this time the chemical composition of the pabulum has not been changed. The passage of the pabulum through the formed material is probably a *physical process*. It is likely that the formed matter, in many cases, acts the part of a filter, and its properties may be such as to allow some solutions to pass through it, and to interfere with the passage of others.

"But in the second stage of the process of nutrition alterations occur which cannot be explained by physical laws. No such changes are known to occur except in the case of *living beings*, and we know of no means of producing them, save by bringing inanimate pabulum into relation with matter which already lives. I, therefore, speak of these as *vital changes*, and I shall endeavor to describe as far as I am able what probably occurs in the matter in this living state.

"Before we can understand the real nature of the process of nutrition, we must learn what goes on in this germinal or living matter when new pabulum comes into contact with it and undergoes its marvelous change. Atoms of matter, formerly in combination, are silently and quietly released. They are made to alter their positions; to move in a manner which we cannot explain; to take up altogether new relations, and acquire new properties. The ordinary attractions and affinities seem for the time being to be overcome, and there is no evidence that while the matter lives its particles enter into combination at all.

"In the process of nutrition nutrient matter, pabulum, with its latent force, passes into this living matter; but who will affirm that the force thus latent in the pabulum is the force which causes the living matter to move and to draw new particles toward it—the force by virtue of which the elements of which it consists arrange themselves in a special manner?

"It would seem rather as if there existed in relation with the living matter some power which compelled the elements of matter to take up certain definite relations to one another—some power which caused matter to arrange itself in a definite way, which controlled the matter and the forces latent in the matter. For how can the power which directs and controls force, be of the same nature as force? Nor is there any evidence of the manifestation of force or ordinary affinities while the matter remains in this temporary living state. The ordinary affinities and forces seem to be actually suspended, and do not again come into play until the matter has ceased to live.

"Such wonderful power is not confined to the germ, as some have said, but it exists in relation with every particle of living matter in every tissue in every organism. It has been called 'directive power or agency,' and has been compared to the direction of machinery by man, as the organism itself has been compared with a machine. If every lever and wheel moved itself, built itself up, and possessed in every part the power of forming other levers and wheels from crude materials while it still performed its proper offices, then some sort of comparison might fairly be made between inanimate machines and living things.

"This power of self-construction is peculiar to matter which is alive, and there is no living thing in which it is not manifested; but there is no other force in nature which can be compared to it. It seems, therefore, correct to call the actions which go on in all living matter, but in living

matter alone, *vital actions*; and to speak of the power to the influence of which these actions are supposed to be due, as *vital power*. If any physicist can explain these actions by any known laws of Physics, then we must cease to talk of vital power. But some physicists, who have ventured to discuss very freely certain physiological problems, have not even alluded to the real phenomena which distinguish things living from things inanimate.

"In nutrition, some constituents of the pabulum have conferred upon them the same powers as the living matter already existing, and thus the latter *increases*, or is *nourished*, or '*grows*.' But the pabulum is pabulum no longer; it has lost its old characters, and has acquired new ones. Its particles are differently arranged; they do not combine to form compounds. There is reason to believe that they actually move in a direction *from* the centre at which they acquired their new properties. It is for the physicist to prove that they do not move *from centres*, or, if he admits that they do, to explain *why* they move in this direction. This tendency to move *from* a centre seems one important character in which every kind of living matter differs from matter in every other known state. This *centrifugal* movement will enable us to explain how the pabulum is drawn toward the living matter; for it is obvious that if the various particles of which a spherical mass is composed exhibit a tendency to move *from* a centre, the fluid (pabulum) around will be caused to move in the opposite direction, and currents will flow *toward* the centre. Thus, upon this view of the constitution of living matter, something like an explanation of the cause of the passage into its substance of matter from without is afforded.

"Now, of the chemistry of this matter, which performs all these active processes and possesses such marvelous powers, nothing whatever is known, save that by its death we can obtain a substance which we call fibrin, another we call albumen, a little matter we call fat, water, and salts. A chemist might say the living matter is composed of these things; but who can prove that these substances actually exist *in* the living matter? On the contrary, they seem to be but *products resulting from its death*, under certain conditions. So that there is nothing in this second stage of the process of nutrition which resembles any chemical process known. In no case does food become converted directly into tissue, or into the products of secretion, or into blood. In no case does food, as food, become oxidized; but it always becomes *germinal*, or *living matter*, the products resulting from the death of which are applied to the nutrition of the germinal matter of the blood, tissues, secreting organs, etc.

"Surely, then, we may consider it established that in the nutrition of every living structure all pabulum passes through the state of germinal matter before it assumes the condition of formed material, and that the character, composition, and properties of the formed material are the consequence of certain changes occurring during the temporary living or germinal state.

"In every kind of nutrition it is this germinal matter, and this alone, which plays the most important part. Without it no formed material can be produced. Formed material (cell-wall, intercellular substance) has no changing, metabolic, converting, or catalytic power. It cannot make new formed material. It cannot alter, modify, change, or convert. It is passive. But the germinal matter does all these things, and its powers

are conveyed to new matter without loss, and this extension of power from particle to particle seems to be infinite.

"Let it not be supposed that I am discussing any unusual or exceptional process. I am speaking of changes which occur in every living cell of every living growing tissue in nature. Nor are the statements I have made applicable alone to the healthy condition. They apply to morbid changes.

"The phenomena of inflammation are mainly due to the increased access of pabulum to living germinal matter. In mortification, in fever, in chronic structural changes in secreting organs—such as cirrhosis and chronic renal disease—in cancer, in fatty degeneration, and in many other changes, germinal matter is involved. The growth of germinal matter, which in the normal state is slow, may be accelerated in consequence of the access of an increased supply of pabulum; or the growth of germinal matter, which in the normal state of things is very rapid, may be interfered with by the formation around each separate mass of a thick layer of hardened and slightly permeable formed material. Not one of these phenomena can occur without germinal matter, nor is any one of them simply a mechanical or chemical change. Those so-called morbid agents, or morbid poisons, which are capable of being transferred from a diseased to a healthy organism, are minute portions of living or germinal matter. A living pus corpuscle, or perhaps a very minute portion of such a corpuscle, from the eye of the person suffering from purulent ophthalmia, coming into contact with a conjunctiva in a certain state will grow and multiply, and thus cause the disease in a person not previously affected. An active living corpuscle from the gonorrhoeal discharge will, as is well known, grow and multiply if transferred to a conjunctival mucous membrane.

"These and many other morbid poisons are, in fact, masses of living germinal matter detached from the germinal matter of a living organism. The active matter of small-pox and vaccine lymph is probably of the same nature, and so, too, the poison of typhus, scarlatina, and some other fevers. These living particles, unlike the germinal matter from which they have descended, retain their vitality, and often for a very considerable time, under conditions which would destroy the germinal matter in the cells of a healthy organism.

"The life of the rapidly-growing pus corpuscle is not so easily destroyed as that of the more slowly-growing mass of germinal matter of the epithelial cell from which it was originally derived, and the cancer cell flourishes where the normal tissue cells had grown very slowly. Germinal matter seems to gain in its tendency to very rapid increase as it loses its power of evolving special and important structures. The power of growing and multiplying under a vast number of different conditions, producing little formed material, and no lasting structure whatever, and the power of evolving definite structure to fulfill a definite purpose seem opposed.

"*Vital* phenomena ought not, therefore, to be ignored in the healthy or diseased *nutrition* of any single cell or tissue, and it is as unjustifiable to speak of any morbid condition as a *chemical* or *mechanical* disease as to attribute the phenomena occurring in a living being to mechanical and chemical operations alone. Disease involves more than mechanics or chemistry, or both combined. Altered external chemical and mechanical conditions imply a modification in the vital changes going on in the living matter, and disease is the consequence; but is as impossible to ex-

plain the nature of the diseased action without referring to the vital phenomena occurring in the living matter, as it would be to give a true account of the process of nutrition without referring to vital changes. A cell without living matter is incapable of exhibiting any of the phenomena characteristic of and peculiar to living things, and the results of any mechanical or chemical changes induced in healthy living tissues are seen in modifications in growth, etc. dependent upon *vital changes* in the germinal matter of the affected tissue.”—(*Med. Times and Gazette.*)

(To be continued.)

“*Virchow and the Cellular Pathology.*—A correspondent of the *Edinburgh Medical Journal* remarks, that perhaps the most remarkable thing he has recently observed in Berlin, is a recent change in Virchow’s opinion regarding the cell theory. This change has been caused by the discoveries of Recklinghausen (Virchow’s *Archives*, about a year ago) in the cornea. He has shown that the corneal cells have not special cell-walls, but are merely *spaces* between masses of intercellular substances. The nuclei in the angles he therefore considers *free*; and he says that many of them can move along the canaliculi from one angle to another. Moreover, he says that the interior of these canals is continuous with that of the lymphatics; you can inject the lymphatics from them; so that, according to him, the origin of the lymphatics is to be found in the canaliculi of the so-called connective-tissue corpuscles. Then he says that the corpuscles of tendon and connective tissue are merely spaces with contained nuclei—a view which, of course, is *not new* to an Edinburgh man. Virchow admits all this; he admits that the corneal corpuscles are not cells. He seems rather reluctant to admit that those of tendon and connective tissue are the same, but he does not deny it; and he told me personally that he *now did not regard a cell-wall as an ‘essential part of the cell,’* as stated in *Cellular Pathology*; but that a nucleus surrounded by a molecular blastema was sufficient to constitute a cell: then he says that the outer part of this cell-blastema consolidates and forms a cell-wall, as Beale has shown; and that this takes place in the amoeba when placed in fresh water. This, of course, is a great triumph for Goodsir, who long ago was cautious enough not to say that the cell-wall is always present.”—(*Med. and Surg. Reporter.*)

Osteoma or Bony Tumors.—In a review of a recent work on “Morbid Tumors, by RUDOLPH VIRCHOW,” a writer over the signature of E. T. C., in the *Am. Jour. of Med. Sciences*, thus treats of this subject: “The opening lecture is upon the osteoma, or bony tumors. The characteristic tendency of these is to osseous formation; this is the acme of their development, and no mere chance. These have been generally designated exostoses, or, as in the Vienna school, osteoid tumors, but the name osteoma, first applied by Hooper, seems the best. The distinction between the osteoma and the ossifying enchondroma, fibroma, lipoma, and many other tumors, in general is easily made, since in the osteoma we recognize ossification as the regular typical, we might almost say necessary, result of their development. There is, however, preceding the stadium of ossification, one presenting the type of cartilage or of connective tissue; but this is only an initial stadium, and the tumor, as such, must be judged of at the time of its maturity. The same combination

forms which we have noticed in our survey of the preceding volume occur here; and these will, of course, obscure the diagnosis and the classification in some instances. The osteoma resemble in their development the bones of the skeleton itself, and we find not unfrequently a formation analogous to that of the long bones; that is, a cancellated structure, a medullary cavity, and a medulla. From this point of view, therefore, we can divide the osteoma into three classes: 1st. *Osteoma durum*, s. *eburneum*, where there is only osseous tissue, vessels, and a periosteum. 2d. *Osteoma spongiosum*, where the osseous substance is of a spongy character, the interstices of which are filled with marrow. 3d. *Osteoma medullorum*, where the medullary cavities are large, and where the medulla itself often forms the larger part of the growth. These divisions correspond in a measure to those of earlier authors, viz., *exostosis dura*, s. *eburnea*, *exostosis spongiosa*, and *spina-ventosa*. A much more important division of osteoma, however, is that into hyperplastic and heteroplastic, inasmuch as osteoma are at one time entirely homologous, proceeding from an excess of formation in bones already existing, and at another completely heterologous, showing themselves in parts which have no normal tendency to the formation of bone. They differ materially from the enchondroma, of which we have already spoken, in one respect, viz., the heteroplastic osteoma are very rare, and when they occur they have no special importance, nor are they of a malignant character, the converse of which is true with regard to the enchondroma and the osteoid chondroma. Both forms proceed from a matricular tissue, analogous to the connective tissue, or to cartilage, or medulla, or some other correlative form of the connective tissue.

"In the consideration of the hyperplastic forms or the exostoses, as they are generally called, we have, proceeding upon the genetic principles of division, first the *cartilaginous exostoses*. Outgrowths of ordinary osseous matter, whether of a more compact or of a more cancellous structure, are found upon the bones, and the surface of these growths is covered with a thin layer of cartilage in the same manner as the articular extremities of the bones. This cartilaginous layer grows on that surface which is applied to the bone, and develops new layers of cartilage, which in their turn first calcify and then ossify, giving rise to new layers of bony substance. Of their origin we know nothing further, nor can we say with definiteness whence the cartilage comes which produces this development. It may extend laterally from the bone in various directions, as in the exostosis of the neck of the scapula, or it may take place at the same time outward and inward, as upon the bones of the skull. Experience shows that they occur at points where cartilage continues to exist for a long time, at the union of the epiphysis and the diaphysis of the long bones; and hence it may be that from some irritant affecting the surface an abnormal growth is developed. Cartilage is also sometimes developed in the periosteum, and in this way it may sometimes be accounted for; still, another source may be original cartilage; and from this source forms, such as the *pelvis spinosa* of Killian, may proceed. The spine, from whence the name proceeds, is found generally at the point of the pelvis where the three bones, the ilium, the pubis, and the ischium, originally come together, and where originally there is a layer of cartilage. Some accoucheurs think that these may, under certain circumstances, injure the pregnant uterus and lead to its rupture.

"Another class of exostoses are those which proceed from the connective

or from some allied tissue, and of these latter the most important is the periosteum. These exostoses may be so placed upon the bone, that the distinction between the newly-formed mass and the old will be very obvious, or the two may be so entirely inseparable, that the line of division can hardly be detected. Many have, of late, designated the former class as osteophytes, and the latter as exostoses. The newly-formed layers are at first loosely applied, afterward become more and more closely attached to the bone, and at length are entirely inseparable from it. The term osteophyte is, however, of much the most general application; the diffuse osteophyte has nothing of the nature of a tumor; they are flat, but extensive bony formations upon the surface of old bones, just such as are produced by a diffuse periostitis. Osteophyte is the most general expression for a cortical or supra-cortical osseous formation; exostosis denotes the more restricted osteophytes, which limit themselves to a circumscribed portion of the bony surface and present the appearance of a tumor. Still further under osteophytes are included the *periostoses* and *hyperostoses*. In speaking of an exostosis, we have reference to a formation with a more circumscribed base, while periostosis denotes a tumor which extends over a much larger surface, and hyperostosis denotes the same condition with regard to an entire bone, or to an entire portion of a bone. The hyperostoses are developed in the most marked degree upon the bones of the face and head. The author cites the case of the son of Forcade, who died at the age of forty-five. The macerated head weighed $8\frac{1}{4}$ lbs., and the lower jaw alone $3\frac{1}{4}$ lbs. The bones of the head are also subject to exostosis, and these may be flat or pediculated, and they may occur upon the outer or the inner surface; in the latter situation they have been supposed to cause epilepsy and other forms of convulsion. The tumor is always covered with a layer of periosteum or of dura mater, although it may not be discovered until the specimen is examined microscopically. The process may go on at the same time, both upon the outer and the inner surface of the bones of the skull. The period of duration of the formation has, however, still another effect upon it: as the osteophyte develops into the hyperostosis or the exostosis; so also a spongy formation may be transformed into a more compact substance, and this again into a spongy mass. This change depends upon the existing relations and comparative amount of medulla and osseous tissue, and also upon the vessels. Many osteophytes are originally porous, some even almost like pumice-stone; such possess large vessels. Afterward the vessels become narrow; a portion of the fibrous medulla ossifies, and the bone becomes thereby thicker and more compact; still later, portions of the osseous tissue become soft by being transformed into a medulla rich in cells, and the bone thus again becomes porous or spongy. The first and last stages are, therefore, not to be confounded, as the relation between the medulla and the vessels in the two is entirely different; so also the compact forms present two distinct appearances: the one corresponds to the cortical substance of the long bones, and is produced by the cancellous structure filling itself with concentric layers of osseous substance proceeding from a continuous ossification of the medulla, (osteosclerosis.) The second form corresponds to the dentine of the teeth, and is formed by parallel layers of osseous tissue upon the surface, proceeding immediately from the periosteum or from the surrounding connective tissue: this is eburnation in its most strict sense; sclerosis is therefore secondary—eburnation primary. The former presupposes porosity or sponginess; the latter

merely a pre-existing tissue capable of ossification, and this, as a rule, is connective tissue and not cartilage. Thus from the structure we can determine the origin; if we find a concentric system of lamellæ around the vessels, the compact condition is secondary; if, on the other hand, the layers or lamellæ are parallel to the surface, it is primary. This, of course, can be determined alone by the microscope. Microscopically, both conditions may have the same ivory-like appearance. These views hold good, not only for the exostoses of the cranium, but also for those of all the other parts.

"The osteoma occur still further in the maxillary bones and in the teeth. The so-called alveolar exostosis of modern times proceeds from the periosteum of the alveolus, and has more the character of a periostosis or a hyperostosis than an exostosis. It commences as an osteophyte filling up the floor of the dental cavity. The extremities also are subject to osteoma. The exostoses of the great toe, though of slight extent, can produce extreme discomfort. Of these there are two varieties: The first, the exostosis subungualis, is seated upon the upper surface of the last phalanx, sometimes upon its inner edge, either under the nail, or at its side; the tumor consists of thick, cancellated, bony substance covered with a periosteum, which sometimes exceeds the bony part in thickness. The second variety occurs between the first metatarsal bone and the first phalanx, and is caused by improper boots or shoes. By pressure the toe is frequently dislocated, and a portion of the articular surface is exposed to direct pressure from the boot; hence arise numerous flat exostoses, and finally the articular surface becomes irregular, uneven, and at last a periostosis is developed; the large bursa may then become inflamed, suppurate, and ulcerate. The whole process is that of a peri-arthritis succeeding a dislocation. We pass by the other forms of simple exostosis, the movable osteoma proceeding from the periosteum, the osteoma found in tendons and upon the trochlear surfaces of the bone—and come to the

"Etiology of the hyperplastic osteoma. The exciting cause, according to all experience, is generally mechanical violence, frequently fractures, and the process is of an irritative if not even of an inflammatory character. It is hence often difficult to separate the osteoma from the ossific products of inflammation. As an illustration of this, we have the callus luxurians; here a normal physiological condition becomes a permanent pathological product. Other causes are found in the extension of inflammatory processes from the surrounding parts to the periosteum and the osseous tissue, as in elephantiasis and peri-arthritis. As for constitutional diseases, the author does not acknowledge the influence of rachitis in producing actual osteoma; he has found external periostosis of the cranium, and hyperostosis of the long bones associated with this disease. With regard to rheumatism and syphilis the cause must be found in the local exposure, and not in the constitutional affection; the bones affected are those lying close under the skin with but little protection from external injury. Predisposition also exerts its influence, and this is especially seen in cases of multiple exostosis. One remarkable case is cited of a boy ten years old, where there were sixty-five exostoses. They were all of a cancellous structure, and chiefly upon the long bones and the ribs; they were seated upon the ossifying edge of the cartilage, and belonged to the latest product of the diaphysis. The predisposition may be either hereditary or congenital; it is also marked during the period of the growth of the bones, and again in old age.

"We come now to the heteroplastic osteoma, which originate in the soft parts, either from thickened or newly-formed connective tissue. These growths are most frequently found in the membranes of the brain and spinal cord. Upon the dura mater they have attained a length of one to two inches, with a width of one-half to three-quarters of an inch, and a thickness of one eighth to one-half of an inch. They are most common upon the falx cerebri, and can always be distinguished from the internal exostosis of the calvarium, from the fact that they are always separated from the bone itself by a layer of fibrous tissue. They are very rare in the interior of the central organs, but are found in the structures of the eye, as in the choroidea and the vitreous body, and also in the lung substance. In the latter case they are by no means to be confounded with the ossification of the cartilages of the bronchi, nor with the petrification in the substance of the lung or in the pleura. The most remarkable, however, of the heteroplastic osteoma both in themselves and for their rarity, are the small osteoma of the skin. They are generally found in old people in a multiple form, and constitute the smallest medullary osteoma known. They appear as small particles of sand in the superficial layers of the cutis, sometimes extending into the cutis vera. Their microscopic structure corresponds exactly to the larger medullary osteoma; they have a broad ivory-like cortical substance sparingly lamellated with a few parallel osseous corpuseles, and within, a round cavity with serous contents."

Contractility of Heart. By ARTHUR WYNNE FOOT, M.B., Assistant Anatomist, Dublin University.—"The auricle is a thin-walled muscular bag; when filled with blood it contracts, driving its contents into the right ventricle. The auricular systole immediately precedes that of the ventricle, and is effected by a simultaneous contraction of all its fibres, in which act the terminal portions of the large veins join. In cold-blooded animals this venous contraction is visible in the *venæ hepaticæ*; it both assists the propulsion onward of the blood and diminishes the tendency to regurgitation. All the large veins which open into the human heart possess, for a short distance, an outer circular layer of the same kind of muscular fibres which occur in the heart. According to Räuschel, they extend along the upper vena cava as far as the subclavian vein, and are also to be found upon the main branches of the pulmonary veins. In large animals the upper cava dilates into a great sinus, and is possessed of a power of rhythmical pulsation, apparently for the purpose of facilitating and regulating the afflux of blood to the heart. These venous movements have been studied by Colin in horses, asses, oxen, dogs, and cats, and he finds, that though synchronous with the movements of the auricle, they neither depend on the movements of the heart nor on regurgitation, for they take place when a ligature is tied round the vein at the point where it is inserted into the auricle. The right auricle is the part of the heart which shows the latest evidences of contractility, and has, therefore, long received the title of *ultimum moriens*. Golz's researches on the action of the heart have led him to believe that the nearer to the *venæ cavæ* a part is situated the greater is its irritability, and that it is in the neighborhood of these vessels the systole commences, whence it spreads, like a peristaltic movement, according to laws which depend upon the connection of the nerves with the ganglia. The systole once begun, by emptying the heart removes from it the stimulating cause

—the blood—with which, when filled again, it again contracts. His observations confirm those of Haller, who supposed that the persistence of irritability in the right auricle was due to the blood nearly always retained there after death—an opinion which he tested by transferring that contractile property to the left auricle by emptying the right one and retaining the blood by ligature in the left. The duration of contractility after death is much longer in cold than in warm-blooded animals. The frog's heart has been seen to pulsate one hundred hours after the animal had ceased to breathe. Pulsations have been observed in the human heart long after the extinction of life. A criminal was hung at ten o'clock in the morning, and died without a struggle. His body was cut down twenty-five minutes after. At half-past eleven a regular movement of pulsation was observed in the right subclavian vein. The thorax was opened, and the right auricle seen contracting and dilating with energy and regularity; the contractions became gradually fewer, and ceased at forty-five minutes past two, but irritability did not entirely disappear until more than five hours after suspension. Rousseau opened the chest of a woman twenty-four hours after she had been decapitated, and found the heart pulsating, and it continued to do so for five hours. Andreas Vesalius, the greatest anatomist of the sixteenth century, lost his life in consequence of this phenomenon of post-mortem contractility of the heart. The story, as told by his contemporary, Ambrose Paré, is, that having obtained leave from the friends of a Spanish gentleman, who had apparently died under his care, to examine the corpse, he proceeded to the dissection, and the heart, on removing it from the body, quivered in his hand. Upon this, the patient's friends accused him before the Inquisition both of murder and impiety, and it was only by the intercession of Philip II., whose physician he was, that his sentence was commuted to a pilgrimage to Jerusalem. While he was there Fallopius died, and the Venetian Senate invited him to the vacant Professorship of Anatomy. On his voyage to Padua his vessel was wrecked on the island of Zante, where this great man perished of starvation, exposure, and cold.”—*(Dublin Med. Press.)*

“Action of Iodine and Iodide of Potassium on the Nervous System.

—DR. M. BENEDIKT, having observed that the injection of tincture of iodine suddenly produced paralysis of respiration and circulation, has been led to investigate the action of iodine on the nervous system. His experiments, seventy in number, have been made on frogs. The solution of iodide of potassium used contained one part in four of water; the tincture of iodine had a strength of one part to three or six. He has found that iodine and iodide of potassium, especially the latter, immediately affect respiration; that sensation is diminished, and finally disappears; that the heart is paralyzed more quickly by iodine than by the iodide of potassium; and that muscular contractility is lost sooner than that of the heart when small doses are employed. The application of iodine or of iodide of potassium to the central extremity of the spinal cord arrests respiration, circulation, and muscular contractility much more rapidly than when the poison is introduced into the circulation. The symptoms of poisoning are more slow in appearing when the poison is applied to the peripheric extremity of the cord. Introduced into the circulatory current, iodine and iodide of potassium attack the central extremity of the cord, and excite or paralyze the organs of respiration

and circulation, and the sensory and motor nerve-fibres.”—(*Medizin. Jahrbucher, Brit. Med. Jour., and Dublin Med. Press.*)

Anæsthesia by Electricity.—“The sedative effects of the constant current,” says M. REMAK, (who is now experimenting at La Charité,) “when the current is very feeble, are exceedingly interesting. To produce such effects, in fact, the current must never excite painful sensations. The sedative action produced by this current differs from that of other sedatives; and it may be employed when, for various reasons, the use of opium, belladonna, etc. is objectionable. One of the most striking instances in which the current is of service is in removing the increased sensibility of an inflamed part. If, in such a case, a positive electrode, of sufficiently extended surface, be applied over the seat of inflammation, and the negative electrode at a distant part of the body, we shall find, in the course of five or ten minutes, that the sensibility of the part has greatly diminished. Thus, for example, in a case of very painful inflammation of the elbow or wrist, we place the positive pole over the brachial plexus, and the other over the scapula; and we find the pain is soon lessened. Lately, in the presence of MM. Claude Bernard, Velpeau, and Beau, I applied the current in the case of a man who ten days before had struck his knee, and suffered great pain at the inner border of the patella. The pain was so great that the patient could not walk except with his knee bent. I placed the positive electrode over the crural nerve below Poupart’s ligament, and the other pole over the extensors of the leg. In a few minutes we observed that the joint became less painful, and the extension of the limb more easily performed. The patient was completely cured by three applications of the remedy. Let me remark to all those who would repeat my experiment, that the curative effect depends upon the surface of the elements of the pile; that is to say, that piles composed of small elements must be absolutely rejected.”—(*Brit. Med. Jour. and Dub. Med. Press.*)

“Electrical Anæsthesia.—In a short article in the *Lombardy Gazette Medica*, March 13, an account is given of a demonstration made by DR. RODOLFI, at the Brescia Hospital, in the presence of a large number of medical practitioners, of the power of the electrical current to induce local anæsthesia. This is complete enough to admit of the execution of painless surgical operations, although it does not appear that any such have as yet been performed; and it is remarkable in its extreme duration, three days being spoken of as a common period. It seems that women (especially when nervous or hysterical) are more susceptible of its action than men, and it fails to produce any anæsthetic action in about 6 per cent. of the individuals submitted to it. In the case of a woman acted upon before the witnesses, anæsthesia of the hands began to be induced ten minutes after the application of a continuous current from a Bunsen’s pile with six elements; and another woman was exhibited in whom complete anæsthesia had affected the whole surface above the diaphragm for three days. An hysterical subject manifested general anæsthesia, with paresis of movement of the limbs, and submitted to have her tongue traversed with a needle. In her case the anæsthesia continued from ten to fifteen days, gradually diminishing. The intellectual faculties continue

in these cases quite undisturbed. In one of the cases experimented upon anæsthesia could not be induced, which Dr. Rodolfi attributes to the aversion the patient felt to the presence of so large a number of spectators.”—(*Med. Times and Gazette.*)

“Odontological Society.—At the monthly meeting of this Society held on the 6th inst., MR. T. BATE produced two specimens (teeth) found in a Roman cemetery during the excavations at Plymouth—the one showing, he said, that the ancients two thousand years ago were liable to suffer from toothache caused by decay; the other showing that in the development of teeth at that time the same laws seemed to hold good, as were occasionally found now—namely, that the premolar was retained after the other teeth were developed. He regarded them as objects of antiquarian interest rather than physiological. Mr. Ramsay brought the patient he had introduced at the previous meeting, in order that the Society might judge of the progress of the case—one of cleft palate. He said the boy had practically worn the instrument only since the 18th inst.; but, notwithstanding his short practice, had much improved in his articulation. The boy read a few lines, and the President and others expressed their satisfaction at his progress. After a short discussion, Mr. Ramsay promised to read a paper explaining his method of treatment at the Society’s meeting in May. Mr. Bate mentioned a question put to him by Dr. Darwin, whether any dentist had seen a third deciduous molar, and, if so, whether such a case was ever known to be hereditary. The President said he had seen three bicuspidis on one side of the lower jaw; but he had no knowledge of the previous history. The thanks of the Society were accorded to the authors of the papers, and the meeting adjourned.”—(*Med. Times and Gazette.*)

Steel.—“In a note to the Academy of Sciences ‘*On the Cementation of Iron by Cast-iron heated below its Fusing-point,*’ M. CAILLETET points out a new and perhaps useful method of making steel. By prolonged heating below its fusing-point cast-iron loses carbon; blades of iron, therefore, heated among clean borings of cast-iron become cemented and form excellent steel, according to the author, who has proved that blades in the same furnace, but not in contact with the cast-iron, are not cemented. The cast-iron loses none of its value in this operation, and the process is therefore cheap and practical.”—(*Chem. News.*)

“Contrivance for retarding rapid Ebullition.—DR. ERLÉNMEYER finds that ebullition of solutions having a high boiling point proceeds quietly and regularly in a vessel surrounded with asbestos tolerably short in the fibre. The asbestos is kept in its position by bending a piece of wire gauze to the shape of the vessel. In evaporating liquids, which are apt to boil in a fitful manner, and in performing fractional distillation, this ‘asbestos bath’ has been found most useful.”—(*Chemist and Druggist.*)

Purification of Gold.—“Gold may be purified from silver by quartation; that is, fusing it with three times its weight of silver, and then acting on the mass with nitric acid; the gold is left as a dark powder, and may be fused after being washed.”—(*Sci. Amer.*)

BIBLIOGRAPHICAL.

The Dispensatory of the United States of America. By GEORGE B. WOOD, M.D., President of the American Philosophical Society; President of the College of Physicians of Philadelphia; Emeritus Professor of the Theory and Practice of Medicine in the University of Pennsylvania, etc., etc.; and FRANKLIN BACHE, M.D., late Professor of Chemistry in Jefferson Medical College of Philadelphia; late Vice-President of the College of Physicians of Philadelphia; late President of the American Philosophical Society, etc., etc. Twelfth Edition. Carefully Revised. Philadelphia: J. B. Lippincott & Co., 1865.

It affords us much pleasure to announce the publication of a new and carefully revised edition of this invaluable work, which no one interested in medicine can afford to do without, as it embodies a vast amount of reliable information on some of the most important branches of medicine, both theoretical and practical; more especially those relating to the history, properties, preparation, and application of remedies. It is, therefore, indispensable to every one engaged in the study or practice of any one or more of the different departments of the profession, as the knowledge it affords is intimately correlated with and is essential to the proper understanding of all. This is as true of dentistry as any other section of medicine, for no one can be duly qualified therefor who is ignorant of the means for the proper performance of his duties. Hence this standard American authority on remedial agents should form a part of the library of the dentist as well as of the physician, surgeon, pharmacist, chemist, and general student. The typography and binding are in the usual clear and substantial style.

A Vest-Pocket Medical Lexicon: being a Dictionary of the Words, Terms, and Symbols of Medical Science, collected from the best authorities, with the addition of new words, not before introduced into a lexicon. With an Appendix. By D. B. ST. JOHN ROOSA, M.D., Aural Surgeon to the New York Eye and Ear Infirmary. New York: William Wood & Co., 1865.

This neat little work is designed as a convenient aid to students, and to a certain extent is well adapted to their wants; but, from the looseness of some of the definitions, will not prove as useful to learners as desirable. Its imperfections may, however, be readily removed by a careful revision, which, it is hoped, it will speedily receive; as a really good manual of the kind is much needed.

Trubner's American and Oriental Literary Record. A Monthly Register of the most Important Works published in North and South America, in India, China, and the British Colonies. With occasional Notes on German, Dutch, Danish, French, Italian, Spanish, Portuguese, and Russian Books. Subscription 5s. per annum, post free. Trubner & Co.: London, March, 1865.

The "object of this publication is twofold: first, to form a medium of communication between American and Oriental Authors and Publishers and the English public; and secondly, to make American and Oriental works better known in Europe." This is a commendable object and should be liberally encouraged, as it will tend to bring closer together the thinkers of different nations, consolidate human thought, extend the area of knowledge, enrich the world, and exhibit more strongly the universal brotherhood of man.

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, JUNE, 1865.

No. 11.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS.

BY J. D. WHITE.

Caries and Necrosis of the Alveoli and Maxillary Bones.—A gentleman, an officer in the Army of the Potomac, thirty years of age, called to consult us, during the Christmas holidays, about a swelling of the right cheek-bone. We examined the parts, and found a small remnant of a root of the first molar, which had been left at the time of extracting that tooth. The wisdom tooth had been lost, but the second molar remained, and was sound; but the swelling was directly above it, as if it were an alveolar abscess forming over that tooth. The small root was extracted, but no pus followed it. A small lancet was passed up toward the base of the swelling, and a small quantity of pus was discharged. As the swelling extended over the malar process of the maxillary bone, and also over a portion of the malar bone, we supposed that these bones were more or less involved; and as the patient was considerably reduced from protracted exposure and hard duty, we feared caries and necrosis of the parts might set in. The patient was instructed to call to see us in a few days, which he did. On examination, we found that the maxillary bone was slightly necrosed. We informed the patient that such was rarely the case; but as his furlough was up, and being unwilling to adopt the diagnosis, he left for the field. An army surgeon was consulted, and our diagnosis was confirmed. The surgeon represented the case to the proper officers, with the suggestion that he be sent back to Philadelphia for treatment, with a furlough for twenty days. Consequently, in five days from the time he left, he presented himself to us for treatment. We declined to receive the case, as it belonged to surgeons and not dentists; but the patient would not be put off, as he returned expressly to be treated by us. On examining, we found a considerable portion of bone dead; it was of a honey-comb character and soft. We removed those

portions which were easily detached, used a weak dilution of creosote on a tent of cotton, instructed the patient to live well, take rest as much as he could, and see us every two days to dress the parts. Sometimes we used nitrate of silver, but the case improved best on the creosote, and during the latter part of the time the following, the parts being well washed with it:—

R.—Potass bicarb., ℥i;
 Aqua, ℥iv;
 Creosote, gtt. xxx.

After all of the necrosed bone was removed, the parts seemed to close up kindly under the above. The duration of the treatment was forty-nine days. This case was evidently the result of contracting a severe cold, which attacked the parts, as they were in a morbid condition, on account of the presence of a dead root of a tooth, at a time when the system was much below a normal standard of health.

A young gentleman, twenty-five years of age, was brought to us by a medical friend. This patient had been under treatment for *secondary syphilis*. He had considerable swelling about the jaws, and looseness of his teeth. A dentist on whom he had called, said there was no cure but the extraction of all his teeth; his medical adviser would not agree to it. On examination, we found the processes of the alveoli between many of his teeth necrosed; we removed the necrosed portions from between the teeth. There was a small portion dead between all of the superior, front, canine, and bicuspid teeth. When these portions were removed, the swelling disappeared, under proper constitutional treatment by his medical adviser, and the teeth were all saved. As the treatment of these cases depends upon their duration, extent, temperament, and former treatment of the patient, they properly belong to the most experienced medical men and surgeons, and consequently cannot receive proper care and treatment by the dentist. All that lies within his duty is to study the standard works on those diseases, so that he may recognize them, when they fall in his way, and turn them over to surgeon or medical practitioner, and assist him in removing dead portions of bone when they appear about the teeth.

(To be continued.)

THE RELATION OF MEDICINE WITH THE DENTIST'S ART.

BY A. C. CASTLE, M.D.

Read before the New York Dental Society, March 29, 1865.

THE subject of this paper refers to the Relation of Medicine with the Dentist's art. It is a subject of great importance, and is well worth the consideration of those dental practitioners who have hitherto considered the *mechanical* successful manipulations of filling the hollows in decayed

teeth with gold and other *matériel*, and replacing the loss of the dental organs with artificial substitutes, as the cap-stone of professional excellence. The most popular demand being for those two mechanical branches of the dental art, as well as being the most immediate in commanding financial and lucrative returns, it is natural that these mechanical, paying branches should be more attractive, and command the more eager and zealous attention than the least paid and little appreciated dignified attainments of professional learning. This is a cause which presents one of the most formidable obstacles to the progress of a professional *status* based upon the degrees of a higher education. Mechanical dentists are merely influenced by vague ideas entertained of the physical details of animal and mechanical relations without the zeal to learn, or possessing the primary inculcations—I will not say education—necessary to enable them to inquire *where* to find, or *how* to proceed to obtain a knowledge of the system of the laws of natural philosophy bearing upon the health, and the normal condition of the system upon which they are mechanically engaged.

The numbers of dental practitioners have so vastly increased over the world, and are still increasing, figuratively, almost by a geometrical progression, that I think the time has come for the respectably established scientific members of the dental profession, as a protection to their own status and dignity, to insist upon some foundation of knowledge and scientific attainments, with moral, social, and professional standing as the CREDENTIALS necessary and required for attaining fellowship with the New York Dental Society—a society established on the supposed learning and scientific attainments of its members, for the purpose of enlarging their scientific usefulness. Look round the world of letters and science! In all medical and scientific associations; in those of pharmacy; in academies of design; in all learned and useful associations wherein men of genius, men of ability in their several arts, sciences and learning are severally associated together purposely, from their higher order of intellect and their comprehensive learning, still further to improve, still further to exalt and extend their influence by more completely aiding the cause of science and learning. It is to these societies that the scientific fame of countries owe their dignity. Is it, then, asking too much,—if this society of dentists is to be based upon the same principles of other learned associations I have here alluded to,—if it be not necessary, at least, that persons asking a fellowship with the members of this society should present a scientific study, a moral, social, and professional recommendation, or being the graduate from some acknowledged school? We have men of ability in this association, and stars of greater and lesser magnitude. May I ask what is the character, what is the intention of the New York Dental Society? Is it an association of the exalted science of the profession, meeting with their wisdom, their council, their scientific

attainments, and by their learning and their experience, intended to elevate the professional character and professional dignity of dental practitioners upon a proper basis to the pinnacle of a true professional name? Or is this association a mere debating society for oracles to speak when "no man's dog must bark?" Or, sir, is it a dental primary school for the ignorant to come and learn the relation of medicine with the dentist's art? Or, what is worse than all this, is the New York Dental Society a sort of "Five Points" humane charitable institution, organized for the purpose, in the words of some of our associates, "to lift and elevate from the *very* gutters and bring them here and teach these dentists what they ought to know;" "make dentists and professional gentlemen of them?"

Sir, the New York and Brooklyn Dental Societies have indorsed the establishment of a dental school. In this school, or in any medical school, the ignorant may learn the laws of physics or natural philosophy pertaining to dental science. They will there learn the relation of medicine with the dentist's art. And when, sir, the ignorant practicing charlatan or his "assistants," or the "gutter dentists," condescend to attend this dental, or any other *medical* school, *and* honorably graduate, with fair, *scientific, ethical, and moral character*, when they shall condescend to do this, and having done this, they condescend to apply for fellowship with the members of this society, *then* sir, we may consistently, with equal condescension, admit them to be associates of this scientific institution. I believe, sir, that you, as well as every other true-minded, honest-thinking, *professional* dentist, will admit that it is asking a little too much of an association of old-established, experienced, practical gentlemen, forming a *learned, scientific association*, nay, A STATE INSTITUTION, if you please, to raise from the gutters the very infusoria and dregs of impudent ignorance and knavish quackery—the self-styled dentist. I repeat, sir, it is asking too much of this respectable and learned body of scientific men to raise such men at once into respectability and professional standing *co-equal* with the most exalted gracing the character of the dental profession. Whether this is done, under the pretended cloak of "*benevolence*," for the public good, or from dental Christian charity for the individual applicants, (sought after,) the degradation is complete. Establish this principle of action. Let our dental charity and benevolence admit every mountebank charlatan, every "gutter dentist," every person that tags "*dentist*" to his name, and your associate roll of fellowship will embrace the names of every adventurer and vagabond who wishes to obtain an indorsement to a professional character for the small charge of two dollars per annum.

Sir, this association is young in years and still younger in associated experience. Like all things else, it must creep before it walks, and it must walk before it runs. The great Lord Bacon says, "A cripple in the right way will beat the racer in the wrong." This association is not a cripple; it can walk. Be careful, run not too fast.

The dentist's art is of scientific elaboration, necessarily requiring the most comprehensive skill, from the most delicate manipulations, self-evident principles, to the uttermost inventive genius of *each* and *every* practitioner: this pertains to its mechanical characteristics. In its relation with medical science their unity exalts the operator from the character of a dental *artisan* to the dignity of professional standing. The knowledge and the science of medicine are not to be obtained in a day, nor are they to be learned at these meetings. Thousands of years have elapsed, developing the science of medicine, and we are still in "Egyptian darkness." Of all records in history which have occurred since the creation, next to Christianity, the most interesting, wonderful, and important is the gradual development and progress made in the science of physics and medicine. The changes and revolutions which have taken place in the political world; the rise and fall of empires; the creation of new States, empires, and republics, are great and interesting events, involving as they do the prosperity of nations, the happiness of the human family. During these eventful periods, MEDICINE, so important to the happiness of man, has had many changes and many revolutions. Sir William Crampton, physician to George IV., in a letter to a friend, published after his death, says:—

"It is somewhat strange, that though in many arts and sciences improvement has advanced in a step of regular progression from the first, in others it has kept no pace with time, and we look back to ancient excellence with wonder, not unmixed with awe. Medicine seems to be one of these ill-fated arts, whose improvement bears no proportion to its antiquity. Anatomy has been illustrated, the *Materia Medica* enlarged, and chemistry better understood. For thousands of years professors have done little more but splitting straws, blowing bubbles, and giving a great degree of gravity to feathers."

"In the same dull round we see them creep,
Profoundly trifling; profitlessly deep;
Treading the paths their sires before them trod;
The past their heaven! Antiquity their god!"

It is to be presumed that man in his *primeval* simplicity was free from sickness and pain, nor needed the dentist's aid. When the descendants of our first parents were assailed by pain, they naturally sought something to remove it. When any remedy was discovered it was carefully noted down, *i.e.* treasured up in memory and used in similar cases. *This*, no doubt, was the commencement of the *healing art*, and although truly empirical, it was *rational* practice, and, as far as my observation goes, it has ever presented the only method, with the aid of pathology, that has been successful in improving medical science. This practice was pursued by people generally till the time of *Æsculapius*—worshiped by the ancients as the god of medicine. *Æsculapius* was the first who collected all the

known different remedies in use. He built a temple and suspended them in it. We moderns would call this an apothecary shop. He described all the various disorders *then* incident to the human body, and placed beneath each such prescriptions as experience had taught him were beneficial. It was in this simple manner that Æsculapius formed medicine into an art, which was practiced with success nearly five hundred years.

In the first year of the eightieth Olympiad, Hippocrates was born, who was destined to effect a great revolution in medical science. He was the eighteenth lineal descendant from Æsculapius. He was called "the father of medicine." Hippocrates was the first of the great *theorists* in the medical world. He endeavored to found his theories on the operations of nature. His indications, in many respects rational and true, tended rather to speculation than to the *discovery of remedies*. It was Hippocrates that taught the great and important truth, "*That all the physician can, or ought to do, is to act as a minister to nature.*" Hippocrates wrote very many books, chiefly devoted in observing and pointing out the course nature adopts in freeing the system from disease, to the exclusion of discovering remedies or means to answer such ends. His system existed nearly two thousand years.

Next followed the *school of Alexandria*, brought into existence by the rise and strife of two rival sects, named the DOGMATISTS and the EMPIRICS. The Dogmatists, or rationalists, insisted before the attempt was made to cure diseases it is necessary to be acquainted with the functions of the body, animal system, with the changes that are produced by various morbid causes, and with the action of remedies in removing or counteracting them. The Empirics, on the contrary, maintained that the knowledge which the Dogmatists insisted upon *is not to be obtained*, that it is impossible to acquire that insight into the operations of the animal system which will serve to direct medical practice, and consequently *the sole guide* of the medical practitioner must depend upon individual EXPERIENCE, either derived from personal observation or the testimony of others.

One hundred years before the birth of Christ, ASCLEPIADES introduced a new theory. He commenced by ridiculing Hippocrates, and called his system "*A Meditation on Death.*" Asclepiades took for the basis of his theory, the philosophy of *Epicurus* and *Heraclides* of Pontus. He attempted to explain all the functions of the body by means of "*molecules,*" "*corpuscles,*" "*atoms,*" "*granules,*" etc. The molecular and corpuscular philosophy attempts to account for the phenomena of nature's organizations by the *figure*, the *motion*, *cellular structure*, *rest*, position, and otherwise of the particles or atoms of matter. *Celsus*, book 3d, chapt. iv., informs us that the system of Asclepiades was a failure, that he soothed the *caprices* of his patients more by the blandishments of his rhetoric than he did by his medical skill. He was succeeded by his pupil

THEMISTON, who endeavored to simplify the theory and practice of medicine. In some respects Themiston must be considered as holding a middle course between the Dogmatists and the Empirics. He made the basis both of his hypothesis and practice, by proposing as a fundamental position, that there are *two morbid conditions* of the body, which are *antagonistic* to each other—a state of *constriction*, and a state of *relaxation*; to these he added a *third* state compounded of the *two* morbid conditions. His practice depended upon the operations of all remedies, which he conceived acted as "*astringents*," *i.e.* "*tonics*," or "*relaxants*," *i.e.* depressants, which he prescribed accordingly.

The followers of Themiston were called Methodists.* Themiston was succeeded by *Thessalus*, a man of defective education, who, like all men of this class, endeavored to supply by arrogant boastings that he had discovered the true theory and application of medicine, and that no one before him had done anything that was valuable on the subject; and he concluded (as quacks of modern times do) by conferring upon himself the title of "The Conqueror of Physicians." His opinions are of no value, serving no other purpose than assisting his own artifice in amassing a fortune.

In the second century of the Christian era appeared GALEN. He may be accepted as an "*Eclectic*," choosing or selecting what appeared to him to be the most rational from the different schools or sects, with the exception of the *Epicurean* system, which he entirely repudiated. Galen's system of medicine held almost undivided sway until about the seventeenth century.

Then came the great HARVEY, the demonstrator of the circulation of the blood, which, with the rediscovery, by a French physician, of the *lacteals*, the system of absorbents conveying nutrition to the blood, opened a new light upon the philosophy of the animal economy. By these important discoveries the whole system of medicine was revolutionized. Previous to the discovery of the blood's circulation through the arterial and venous systems, all the great physiologists of ancient times fancied that the arteries were "*air-vessels*" or "*air-tubes*." What fallacies in "Scientific Medicine" must have been perpetrated with such an hypothesis as this! This great and beautiful discovery enabled the philosopher to comprehend a simple hitherto latent mystery. It enabled him to penetrate into the secret recesses of animal nature. Though the possession of the Promethean fire must ever be ranked with the impossibilities of the *Elixir Vitæ* and the Philosopher's stone, yet the light

* The respectable society of Methodists received their appellation from this sect of physicians in consequence of the zeal, piety, and uniform conduct of their founder. Mr. Wesley and a few of his colleagues, while students in Oxford College, in derision, were denominated Methodists.

of this great discovery almost daily opens upon us new wonders for our amazement; and as the great scheme of our creation becomes more unfolded to our view, we impassionately exclaim with the Poet Byron,

“Are not the mountains, waves, and skies a part
Of me, and of my soul, as I of them?”

This wonderful light of the source of and continuation of our creation did not help medicine much. It served only in a manner to *redouble* the rage for new systems. Nothing else was thought of but to cause the blood to “circulate more freely,” to “destroy its “viscosity,” (!) to draw off from the body *that* which was supposed to be “*corrupted*,” “to purify it”—“to correct it”—to “preserve the blood-vessels in a relaxed and pervious state,” etc. Hence the torrents of slops with which *Bontekoe* and his followers deluged and washed out their patients. Hence the sanguinary fury with which the *Sangrados*, the partisans of *Bottalli* thought themselves entitled to exercise in *their* treatment of all sorts of diseases, in age and youth—a treatment by which the great Washington was relieved of *ninety ounces* of blood within twelve hours, and by which treatment the more youthful man, the Poet Byron, died !

As the knowledge of chemistry advanced and the medical mind became impressed that man was created from the dust—the nutrition of the earth—*chemical doctors* came into vogue. These chemical medico-practitioners at once turned their patients into portable laboratories. *Eureka!* they cried aloud, “we have found the true system!” Forthwith they drenched their patients with chemicals. They manured them with the phosphates, and treated them pretty much on the same principle as the farmer treats his land. Overlooking the fact that gallons of beef-tea, with all the essences of vegetable nutrition, too often fail to nourish or to save the sick; while a poor shipwrecked sailor, tossed on the ocean’s billows, or left on some barren spot, his system in a normal condition, has survived the diet, for eight or ten days, upon an *old boot*.

After Harvey came the great SYDENHAM, called the modern Hippocrates; then HUNTER, the eminent anatomist, physiologist, and pathologist; *Munroe*, of Scotland, Boerhaave, Cullen, Sir Charles Bell, Marshall Hall, and many other eminent men who have ably demonstrated the book of Nature.

The Schools of Egypt and Arabia, the eminent men of Greece and Rome; the great anatomical teachers and philosophers of the middle ages, by progressive gradation, have brought medicine to a scientific system; and, as we proceed, the more we are able to explain and facilitate the attainment of this, or any science, the more we will find that science approach perfection. Scientific principles present but a mathematical system found in all creation. The great Designer of the universe, in the creation of the first crystal, showed this. He proclaimed it when He

made the sexes of the vegetable kingdom; when, by the zoophyte, or plant animal, He united the vegetable to the lower link of the animal world; when He further progressively developed His plan of infusoria, insect life; fish and reptile life, and the higher order of animals; last of all, when He completed the chain of beings with the creation of man.

The gutter dentist, whom we are called upon to redeem from his slough of degradation and ignorance, and elevate into a fellowship of this Society, no doubt will exclaim, What has all this to do with the dentist's art! I can extract teeth with laughing-gas. I can fill teeth and make artificial teeth, by which I can make more money! I don't care about all this learned stuff! Unfortunately for the character and dignity of the dental profession, this is too true. For I am free to say, when the student shall have acquired a knowledge of the world, of the world of letters and of science, he will discover that mankind has not at all changed since the days of King Solomon, who, after searching the world, "returned and saw under the sun, *that there was neither bread for the wise, nor riches for men of understanding, nor favor to men of skill.*"

Dr. Channing, of Boston, on Self-Culture, says: Intellectual culture consists not chiefly, as many are apt to think, in accumulating information, though this is important; but in building up a force of thought which may be turned at will on any subject upon which we are forced to pass judgment. This force is manifested in the concentration of the attention; in accurate, penetrating observation; in reducing *complex subjects* to their elements; in diving beneath the effects to the cause; in detecting the more *subtle* differences and resemblances of things; in reading the future in the present; and especially in rising from particular facts to universal truths. Thus two classes of men exist: the *one* always employed on details or particular facts, and the *other* using these facts as foundations of higher truths.

We daily are reminded of the "march, the strides of intellect," of the progress of many branches of science. I have indulged in a bird's-eye view of the world of medicine. Whether it has kept pace with the other sciences, learning, and arts of life, or excelled them, or whether it has fallen short in the rivalry of improvement, I shall not detain you to expatiate upon. The question here presents itself, What relation has medicine with the dentist's art? I may ask, has medicine reached the dentist's art at all? Or, has the dentist reached toward the art of medicine? If it have done so, the question is, Has the dento-medical art approached toward improvement?

"What am I, whence produced, and for what end?

Whence drew I being, to what period tend?

Am I the abandoned orphan of blind chance?

Drop'd by wild atoms in disordered dance?

Or from an endless chain of causes wrought,

And of unthinking substance born with thought?"

This language of the poet singularly applies itself to the dental organs. Are they not a part of ourselves as we are of them? Have they not vitality, nerves, arteries, veins, and functions coequal with any other organ or system of the animal economy? They assist in forming the voice by modulating the tones. In this respect they harmonize the intonations as musical chords with stops. The teeth are the great conservators of the respiration, thus protecting the lungs, by forming a dam against the excess of use of the breath, permitting no more expiration of air or breath from the lungs than is absolutely necessary for the articulation of sounds and words. Observe the toothless; how soon exhausted with talking or reading aloud.

The birth of the first tooth is not less interesting to mothers and nurses than is the first pregnancy and the birth of the first child. The birth of the first tooth is commonly expected with anxiety. Why is this? Because experience exhibits that, before the *dormant germ* can be called into the action of organization, before the embryo teeth of the dental system can be developed, there must be a complete corporeal revolution, attended with *fever* of more or less intensity, varying according to the various conditions of particular constitutions. The embryo tooth, like the embryo infant, is the offspring of a *womb*, tiny indeed, a little cell, rightly enough termed by anatomists *matrix*, that being only another Latin word for *uterus* or womb. Examine this germinating tooth in its matrix. What nerves are there implicated, anastomosed, and sympathetically excited into action! All the nerves of the senses, the nerves of motion, of respiration, and other important nerves are constantly influenced more or less by the process of *dentition*, with constant revolution, which ushers in every kind of corporeal disorder. Every spasmodic and paralytic distemper you can name,—convulsions, water on the brain, serous, apoplexy, lock-jaw, squinting, affection of the spinal marrow, with all the family of structural disorders, from cutaneous rash to mesenteric derangements, consumption of the bowels, *marasmus*, etc., etc.; with aphthous affections of the mucous membrane of the mouth, organs of respiration, stomach, etc. etc.

Sir Humphrey Davy remarks: "It has been too much the fashion in philosophy to refer operations and effects to single agencies; but there are in fact in nature two grand species of relationship between phenomena: in one an *infinite variety* of effects is produced by a single cause, in the other a great variety of causes are subservient to one effect." This observation with propriety may be applied with particular force both to the causes of dental diseases, and the "infinite variety" of *constitutional causes produced from their effects*.

I shall not occupy your time with enumerating diseases of the dental organs, and the softer tissues embracing and sympathizing with the teeth. I need not enlarge on the miseries the derangement of the dental system inflicts upon man from the cradle to the final resting of the body. How

many dentists are there in our midst who can say what is the relation of medicine with the dentist's art! What a just observation was that of the author of *Lacon*, "The rich patient cures the poor physician more often than the poor physician cures the rich patient!" Does not this apply to the poor dentist, who sets his own teeth in action much better than he sets the teeth of those who pay him?

To be the ACCOMPLISHED DENTIST, the study of medicine is paramount; with the study of the human body, in connection with medicine, the student studies the universe; and insignificant as the *unthinking* may deem the dental system in its relation with medicine, the universe cannot be studied by any philosopher with these organs in a state of mutiny.

The first dentist mentioned, according to Cicero, was Æsculapius, who practiced tooth drawing. In the temple of Æsculapius, the record says his followers suspended a *leaden forceps* to illustrate the importance they placed upon the presence and the preservation of the teeth to the animal economy, which was to show that no teeth should be extracted but such as were sufficiently loose to yield to a leaden instrument. To a great extent my views accord with the ancients. I believe it to be sound practice to preserve to the animal economy all that can consistently with health be preserved to its uses. The Creator formed the intricate dental system for an important and special purpose. I deem the man who would extract a tooth or teeth which can be useful to the animal economy, as nothing short of being an *ignoramus*, or, what is worse, a *knave*. As well might a wigmaker cut off the remaining circular hair, and its scalp of fleshy tissue, to make a more complete substitute wig; or a surgeon amputate a deformed limb for a Palmer to make a *more faithful* (!) substitute.

Sir, can we anticipate our profession being exalted? Can we expect that the numerous dentists will trouble themselves with the relation of medicine with the dentist's art, when an ex-president of this Society germinates into an active practicing dentist a traveling mountebank charlatan; while other dentists, *members of this Society*, openly avow that they send their patients to this charlatan to have their teeth extracted? Who advertises to the public to come to "Headquarters," where they are assured the gas is "most pure," and that "no pain" or "no pay" is their principle! Who says they have the "best" assistants for filling teeth, and "superior material" for making artificial teeth. It was the other day, sir, I met the best "assistant" of the Dental Gas Company, who boasted to me that this company *did more good* than the New York Dental Society. In this, that the members of this Society sent very many teeth to the Dental Gas Company to be extracted, which the gas company preserved to the patients. Is this the intention of this scientific association of learned men, that they thus confess their inability to exercise the professional art they individually boast as being the *ne plus*

ultra perfection, as they practice and understand it? Hear it, a twelve-month Dental Gas Company the superior to the New York Dental Society! I ask you, Mr. President, as an accomplished gentleman, a professional gentleman, if this be the method we are to adopt to exalt the medical science of the dental art, and to establish the character of this Society as a *scientific association*? I will answer the question for you, sir. No, emphatically NO. Is this a type of the relation of medicine with the science of the dentist's profession? Again, I repeat, no.

Thirty-five years of dento-medical practice, study, and observation, to my mind, have demonstrated the fact that the teeth and the dental system cause as much *constitutional irritation* as any other organs of the various systems of the animal economy. Being more subject to disease and abnormal conditions, the teeth trouble man comprehensively more than the delicately constructed organs of vision. The teeth in very many instances require constitutional treatment. Two-thirds of neuralgic, rheumatic, and nervous derangements are merely sympathetic with deranged action of the dental system within the substance of the teeth and their surrounding soft tissues. This fact I have in very many instances demonstrated by instantly removing the odontalgic sensibility in the tissues of the teeth, not only for these affections, but for the *immediate filling* those teeth of susceptible tender dentine. The fact of the instantaneous removal of odontalgic sensibility and irritability in sensitive dentine fully demonstrates the relation of medicine with the dentist's art.

The task, however, of unfolding and rendering comprehensible to the general understanding the important subject of the *relation of medicine* with the dental art, can only be realized by the earnest desire of those gentlemen who with zeal would become *professional* as well as *mechanical* dentists, by contemplating nature's great truths which are spread before them. We want, then, the means of rendering the study and science of medicine in its relation with the dentist's art *more personal* and *practical*; more a subject of individual observation and *demonstration*. To this end we must look to a proper education, to be guided by the scientific truth and *applied* skill of experienced observers. Our *understandings* enlightened by the standard truths of anatomy and physiology and pathology; our senses sharpened and aided by all that optics, acoustics, hydraulics, chemistry, and mechanics can do for us. When with these we can be *honest to ourselves*, by freeing our imaginations from the *creative* gigantic self-indulged exaggerations of the general dental practitioner, we may then hope to succeed in establishing our claim *among learned societies* to scientific character. We may then be enabled to discover the active agency destroying our organization, nature's mode of warfare on the dental economy, trace out her weapons and plans of attack upon the citadels of our animal system, and being thus prepared, the relation of medicine with the dentist's art will be at once recognized and scientifically combated.

BLEACHING TEETH.

BY WM. H. ATKINSON, M.D.

Read before the Brooklyn Dental Association.

To understand the process of bleaching teeth and to successfully practice it, involves a deeper erudition in philosophy than is common even among professional men.

It requires minute anatomical apprehension, no less than insight, of the movements of the small bodies that elaborate the function of nutrition, the process by which tissues are grown and destroyed.

We might be completely conversant with these movements as to their relations to demand, supply, appropriation, and distribution, or rejection of the unprepared or incompatible foods presented to them, and the waste material of their own personalities as they become effete, and yet if we omitted the study of their relations to light we should utterly fail of comprehending the principle or power that effects the molecular process that we denominate bleaching.

This question can be apprehended only by the comprehension of the laws of optics, the phenomenon of light, and the changes occurring in physiological and pathological nutrition, and the partial and complete solution of the organs we contemplate.

Probably no chemical change can take place in a body without the physical relationship of its atoms also suffering change.

But what degree of derangement is necessary to vary the absorbing, reflecting and refracting power of the body to make it apparent to the eye, has not been determined.

In fact, the ability to detect slight differences of shade and color varies so infinitely in the different degrees of natural power and education of the faculty, that there can hardly be found two individuals to agree upon a standard that shall be satisfactory in its details.

Some detect shades well who are not sharp in the apprehension of color; while others, who detect readily strong contrasts in color, can hardly distinguish shades when nearly allied.

The nice perception is pained at the presentation of degrees of difference that would pass quite unnoticed by the dull or undeveloped perception of differentiations, and hence the everlasting jangle among dentists and patients on these subjects.

Now it is not pretended that any one knows the solutions to the questions that arise when we contemplate the subject of bleaching the substances which are usually subjected to this process for the production of textile fabrics, much less that we understand the less definite and more difficultly managed subject of bleaching teeth in the mouth.

But because we have not yet exhausted the detail of this matter it is

no reason why we should not take the more pains to peer into the dark abyss before us until we shall have developed increased powers of perception and understanding respecting the occult laws and processes whose works are displayed in the changes producing the evil that bleaching is invoked to remedy.

Most of our processes for bleaching are, as yet, purely empirical or experimental, as are most of the efforts at healing the other ills to which we have fallen heirs.

That which constitutes transparency is doubtless unitary relations of arrangement of the molecules of a body.

This is proven in the examples of coloration and decoloration displayed in the demonstrations of chemical teachers, who mix various solutions of diverse affinities to produce colors, and those of mutual affinities to reduce these again to colorless, transparent or opaque solutions, just as unity or diversity is attained in molecular movements.

Any agent strong enough in solvent power to completely break up the molecular arrangement of the particles of a body is capable of producing its *clear* solution.

Adventitious and opposing affinities and movements interfere in the degree of their presence. Hence we are quite at a loss as to the particular molecular changes which accompany the degrees of refraction, reflection, and absorption that accompany the decolorations amenable to bleaching.

Teeth are liable to discoloration, which renders them unsightly rather than useless.

Various causes contribute to this vexatious result. It arises principally from death and disintegration of the pulp, spontaneously or adventitiously produced. Pulps may die and be absorbed without great change in the color of the crowns to which they belonged. But, generally, when sudden death of a pulp takes place, it decomposes, infiltrating the structure of the dentine with the coloring matter of the blood, turning the tooth pink, gray, brown, or blue.

The younger the patient the more disastrous will be the conditions which cause discoloration of the teeth. The chief reason of this is the porosity of the dentine being so much greater than in adults and persons advanced in life, whose tubuli become consolidated, or at least much attenuated, reducing the calibre capable of containing matter, the changes in which produce the discoloration.

I have discovered one form of discoloration that renders the teeth subject thereto even more indestructible than other teeth in the same mouth which are regarded healthy.

I refer to that peculiar calcific infiltration of the tubules with limesalts that gives the tooth a deeper shade of yellow than even the canines of dense structure so common in well-organized teeth.

There is one form of death of the pulp which produces so little change in color of the tooth that it may be present for a long time without detection. I refer to the death by benign suppuration, leaving the converted pulp "in situ," which prevents molecular change in the contents of the tubules to the degree necessary to effect the light-pencil sufficiently to cause the detection of the state, short of the closest observation.

It is fortunate for us that this is not destructive to the strength of the tooth until further change takes place in the pus column, generating acids or gases, whose actions are soon apparent through change in color.

It is profitable to inquire, what have our empirical observations and efforts taught us upon this subject? They have taught us by experience that the great desideratum concerning the color of "devitalized teeth" (so called) is, imperviously closing of the open ends of the tubules.

A thing, by-the-way, difficult to do and scarcely ever attained by any but the most patient and painstaking members of our body.

But if we set about it with this knowledge beforehand, we are more likely to see our efforts successful. No mere hap-hazard procedure can be uniform in its results.

First comprehend the principle and then adapt modes of procedure thereto, and the best will soon stand revealed to our vision.

The best results thus far attained have succeeded the following procedure, viz.: Cutting away the discolored dentine, so far as possible, without too much compromising the safety of the enamel, then carefully fill the root or roots nearly to the nerve chamber proper, in the crown of the tooth. After hermetically stopping the canal thus far, proceed to introduce chlorine in some form.

Some prefer the gas, freshly generated, conducted directly into the cavity by means of a small glass tube, drawn to a fine point to enable the operator to direct the current as it flows immediately against and into the open ends of the tubes of the discolored dentine. The only serious objection to this method is the liability to produce unpleasant congestion and trouble of the mucous membrane of the air-passages. Some use common chloride of lime, introducing it in a wet state, and changing it once in five or ten minutes, until the desired bleaching is obtained. Others introduce precipitated chalk made into a mortar, with Labarraque's solution of the chloride of soda, changing this often until the tooth is sufficiently bleached.

In case any or all these methods fail to produce the desired result, dismiss your patient for a day or two, advising him to keep the cavity open to the air and free from food and all foreign substances, closing it with wax, cotton, or paper, during eating; remove it, and rinse freely with a solution of soda immediately after. If these steps be faithfully taken, the worst cases will yield and be ready for satisfactory filling in less than one week.

FORCES.

BY C. R. BUTLER, M.D.

Read before the Northern Ohio Dental Association, May 2, 1865.

Mr. President and gentlemen of the Association, this may seem at first a novel text or theme to present at this time, nevertheless, we as practitioners and investigators of a specialty of no minor importance, have much to do with forces, of a mental, moral, and physical character.

And if my conception serves correctly, we have come together for the purpose of exercising the mental, in giving each to the other, the modes we may have of applying these forces in our various spheres of professional labor for the amelioration of human deformities and suffering.

No truly intelligent man would think of employing a rough stone-cutter to cut, carve, and chisel, out of marble, for him, a Powers' Greek Slave or Bust of Innocence to grace his finely ordered library.

Neither would a master machinist select a common forgerman for a steam boiler inspector, and expect him to have his hand and ear finely disciplined and attuned, as becomes the adept by long practice in percussing rivet heads with his hammer to ascertain their sound or unsound condition.

And if we desired a careful and *thorough* examination of the thorax and its contained organs, we would seek the man that has the most finely attuned perception of the science of percussion and auscultation; a man that understands just the requisite amount of force in percussing or applying the phonophorus, that he may not chafe his patient, and thereby avoid an incorrect diagnosis of the case.

Some say "all these fine theories are nice things to *talk* about, but they are not worth *my* while; I want to know how the most money is to be made in dentistry with the least possible time expended and money invested."

Would-be dentists frequently make the inquiry and announcement: I have some mechanical genius; how long will it take me to learn the business? what are your terms? etc. etc.

Our reply is, if you are fully determined to enter upon the *study* of the science, you must make up your mind to spend much time and some money, coupled with earnest and persistent effort, before you can become a proficient operator.

And, gentlemen, if we were to take a high stand in regard to these things, we would have less quackery and a much larger number of good operators in the field, and our schools better supported.

We should have integrity and honest pride for our profession, and force of character to freely and fully state these facts, that those of an earnest and honest purpose may start out in the right direction, and, in

after-years, have cause and disposition to thank and respect the man that was candid enough to point out or indicate to him the landmarks, which, if followed, would lead, ultimately, to happy success, instead of finding himself, as many do, constantly in the wilderness of uncertainty, doubt, and fear, in consequence of starting without the requisite chart and compass, *i.e.* a thorough preparation for the field of labor they desire to enter.

The medical and dental schools are doing a great work in the way of giving young men a systematic course of *preliminary* instruction, and the importance of these facilities are becoming more and more apparent in our profession. The people see and know the good resulting from a better preparation of young practitioners than formerly. And what is the popular appellation that a mushroom professor or *doctor* gets when he opens out with big signs and *more* extravagant advertisements, and with his wonderful self-assumed knowledge and mysterious discoveries, he proclaims to the world his ability to cure in a twinkling *any* kind of disease, extract teeth, and set them without *pain*, and *warrant* success and satisfaction in every case, all of which he will do for a very small fee. (?)

The moral force and effect that these things have on the professional standard are quite apparent to all earnest seekers after light and truth, and if we do not wish the Gordian knot cut, we must not allow it put into unskillful hands.

We would not, however, deny the fact that many good and worthy operators are scattered through the country, who have never passed the curriculum of a medical or dental school, men that we would all cheerfully honor; but they will say it has cost much time, labor, study, and long years of earnest effort to reach their present standard, which, with the great facilities and improvements of to-day, could be reached with far less labor and time by those wishing to enter the profession.

Clinical instruction in a medical or dental school is one of the best modes of bringing theories into practice before the mind of a student; he may stand by the sick-bed and operating table month after month, and observe the skillful surgeon operate, and think it quite an easy and simple matter to use the knife, apply the ligature, suture, and adhesive strap, but if he should attempt to put his supposed knowledge into practice, even in as apparently simple a thing as tying an artery, he would find that he had come far short of perceiving the requisite amount of force required to just break the inner or middle coat of the artery, which is an essential point of success in an operation.

The dental student may stand beside the chair of an expert operator and watch his fine manipulations in filling and extracting, and even quite difficult operations may *seem* simple and easily performed.

The text-books also give him many descriptive illustrations of how the various operations are managed and accomplished, how the forceps should

be applied, and the direction in which the force should be made; how cavities of decay should be excavated and shaped, gold introduced, condensed, and finished up.

But all, or any of these things, can only become realities to him, as he may, by degrees, make use of them through his own head and hands on living organisms.

He may gain, it is true, much by lending a helping hand in conjunction with the operator, by using the mallet, and in various ways acquire a practical knowledge under the instruction of an earnest, faithful practitioner and tutor, that will be of more lasting benefit than in any other way.

Our field of labor, when thoroughly viewed, is varied and extensive, and in order to meet the demands, our whole being should be thoroughly disciplined, so that the organized forces that are to be expressed may be productive of health and beauty, instead of destruction and death.

It is not always the man that has the greatest amount of physical force that can perform the finest or most difficult feats. Thus, in the various operations that we are called upon to perform, precision and delicacy of touch, and prompt action, will accomplish that which physical *force* alone would fail in gaining.

The surgeon that performs successful operations with the fewest strokes of the knife, and the least pain, is skillful, because his accumulated force is concentrated and applied through his fingers guided by an educated head.

The operation of filling teeth, thought by many to be a simple one, is known to be (by those that have faithfully performed it) one of the most difficult and perplexing operations in surgery. Much care is requisite in our efforts to make a good solid filling that we do not *overdo* it. In the manipulation of adhesive gold we are liable to fail in having it packed tight to the *walls* if the cavity be irregular, and all the force, whether it be by the mallet or hand, that we can apply will not remedy the imperfection. Unlike operations in soft tissue, where if the wound fails to unite by immediate union, or first intention, the granulating process comes to our relief, and nature accomplishes what art failed to do.

If operations in our specialty require so much skill and precision, let us put a proper value upon our attainments, and show to the world by our successes, gained by *thorough* operations, that we rank second to none in the catalogue of surgeons.

SOLDERING TEETH.

BY J. D. ELLIOT.

THE DENTAL COSMOS of April, 1864, came to hand last evening. I noticed a call for something that would clean gold and silver plates after being repaired, also a word about springing of plates and cracking teeth.

For the last twenty-five years or more, I have boiled my plates in alum and water, and they always come out clean, providing that I do not use the same water too long, and that the alum is clear or free from an oxide; if not, your plates may be more or less galvanized, being always careful to put the alum and water into earthen vessels; if you should use a tin cup, your plate would get a coat of tin.

By using alum, you get rid of the fumes of the acid, which rusts everything that comes in its contact.

I do not think that the teeth absorb moisture or anything that inclines them to crack, but believe there may be two reasons for it: too rapid heating, or unevenness of heat, when heating up the mass or while soldering; also the pressure of the roof-plates against the top of the teeth. With your pliers or burnisher set the plate out hard against the top of a tooth, then inclose in plaster and sand, and you can imagine the result when heated.

For a time, I was more or less troubled with the springing of my plates, which has long since vanished, and perhaps it would not be amiss to give a short description of my soldering apparatus, which is old enough to have its time and be relieved from further use. I have what I call a soldering-box, something in shape like a horseshoe, with a rim around the outside, except the heel. Across this heel 3 inches, from heel to toe $2\frac{1}{2}$ inches, rim about $\frac{7}{8}$ inch high, and riveted to the bottom, all made of sheet-copper, which will last longer than sheet-iron, and the rim can be bent in or out to diminish or increase the space between it and the teeth, which should be from $\frac{1}{4}$ to $\frac{1}{8}$ inch. I use twice as much sand as plaster to inclose the teeth and plate in the box. After arranging the teeth on the plate, I fill the hollow of the plate, opposite the teeth, with the sand and plaster in a plastic state, and, spreading some on the bottom of the box, then put in the plate, and press it down so that the crown of the teeth will come a little below the top of the rim, then spread some between the wisdom teeth and the box, then add a little water to the plaster, and pour to fill up the space around the other teeth, and cover the teeth from the backing to the top of the rim immediately inclosing them. When the plaster is set, any amount of handling, cold or hot, will not alter the plate or teeth; the plaster cannot flake off from heat or outside accident, neither will it shrink or crack, but hold the teeth and plate in their fixed position. In soldering, I use what I call a basket; it is, in fact, a coarse wire screen, in shape like the fly screens used to cover butter on the table, 7 inches in diameter across the rim, and 5 inches deep; I make them around a nine-pin ball, and they will last five or six years. This basket is to hold the charcoal, the soldering box, containing the teeth to be soldered. This wire basket will allow the air to circulate all through the coal and around the box, heating it evenly and gradually, if covered with a few pieces of charcoal.

To hold my basket, I have a thin cast-iron bed-plate, about 12 inches long and 9 inches wide, with rounded ends, with a flange around it $\frac{1}{2}$ inch high, to keep the coal and ashes upon it. Then I have a piece of stove-pipe, 6 inches long and 6 inches diameter, cut away on one side to within 1 inch of one end, which I call the top; the other end is spread open to the diameter of the end of the bed-plate or bottom, and riveted to the flange. On the top of this funnel I place my basket, facing the opposite end of the bottom, and the top of the basket on an angle of about 45° , then put in some live coals, and charcoal on them, put in the soldering-box, not above the centre, and on about the same angle, the front teeth down, and cover them up with a few pieces of coal. At the other end of the bottom there is a small space, filled up as high as the flange, to screw a rod into, to hold an arm for the lamp, about 7 inches long; there is a round bottom, the neck passing through the slat, and soldered to the bottom of the lamp, so that it can be moved on the arm, and, by turning the arm, you can place the flame of the lamp in any desired position, and the basket, being a half globe, it can be turned any way, so as to place a tooth in the right position to be soldered. Between my mouth and the blow-pipe, I use a spiral wire rubber tube, 2 feet long, holding the blow-pipe in my left hand, and using my soldering wire with my right, always being careful to let the charcoal keep the work at a red heat, and never allowing the blow-pipe to raise the heat to a soldering heat when the mass is at a black heat, because there is great danger of cracking teeth and springing plates, caused by local expansion in local heating. Just look at a watch-case after it is soldered and before it is heated on a plain, and one can easily understand what uneven heating does for a dentist, and is without the case's remedy.

In looking at the DENTAL COSMOS, I find the call a year old, but this is written and I will send it, although it is so late.

PRACTICAL SUGGESTIONS.

BY F. A. BREWER.

TO KEEP THE JOINTS CLEAN IN RUBBER WORK.—In the December number of the DENTAL COSMOS, O. A. J. gives his method of using thread to prevent rubber from entering the joints of teeth. My method is to use a piece of raw cotton instead of thread, twisting the piece at both ends, which, of course, leaves it fuller at the centre, thereby allowing the rubber to fill up the space which otherwise might be exposed to view, after finishing the piece.

WARPING OF RUBBER PLATES.—My experience has been, that warping of rubber cases is caused by being too hasty in taking them from the boiler when too warm. Hurried work will not answer. Two pieces

cannot be constructed in the time properly required for one. Many flasks are placed in the vice, and too much power applied, at once, causing breakage of teeth or the more delicate parts, instead of allowing time to insure a successful result.

TIN FOIL.—Is tin foil poisonous? If not, why are our professional brethren so very reluctant to use it? Is it nauseous? If not, why not employ it? Will it not preserve teeth when properly used? Why not, then, encourage the use of it? Does its name signify a substance too common, in the eyes of the people, on account of its daily employ in the tin shops? Or do patients murmur when the required fee is announced, because it was nothing but common tin? Is it not far better than amalgam for many cases in which the latter is used, although the patient may believe it far more costly than tin? On these accounts, and considering its quick and easy application, I fear there is a wholesale employment of it by the young practitioner, and far too much use of it by the more experienced. A recent observation of a patient's mouth, who had eleven plugs of tin foil inserted in her teeth, twenty-nine years ago, still in good condition, although exposed to a constant friction, demonstrated clearly to my mind that tin foil plugs, inserted with the same amount of care which is bestowed on gold plugs, will last as long as the latter, in a great majority of cases.

AMALGAM.—Be certain to squeeze out all the mercury through buckskin, using a pair of large flat-nosed pliers for that purpose, and then you will obtain all the good, and as little of the evil as may be.

FULTON, Mo.

IMPROVED KEROSENE HEATING APPARATUS.

BY W. S. ELLIOTT, D.D.S.

AFTER having instituted many fruitless experiments to adapt the kerosene lamp to the heating of my vulcanizer, I at last succeeded admirably, by the adoption of a very simple apparatus, which may be described as follows:—

The lamp is of large size, but of ordinary construction, having a flat wick, $1\frac{1}{2}$ inches wide and $\frac{1}{8}$ of an inch thick. Surrounding the wick-tube is the usual brass cone; upon the flange of this cone, where the glass chimney is usually made to rest, is placed a cylinder of tin plate, $2\frac{1}{2}$ inches in diameter and $\frac{3}{4}$ inches in height; securely attached to the upper end of this cylinder is an inverted hollow truncated cone, constructed of the same material, the smallest diameter being the same as the cylinder, the largest 6 inches, and the height $1\frac{1}{2}$ inches. Upon this again is permanently secured the base of another hollow truncated cone, the largest diameter of which is 6 inches, and the smallest made to correspond to the

diameter of my vulcanizer, which is $3\frac{7}{8}$ inches; the height is $7\frac{3}{4}$ inches. This leaves a distance of $4\frac{1}{2}$ inches between the wick and the bottom of the vulcanizer, (Hayes' two case boiler,) when placed in at the top of the fixture. About midway between the ends of this structure is made a mica window, 2 inches in diameter, and at $1\frac{1}{2}$ inches below the upper extremity is punched six $\frac{1}{2}$ inch holes, equidistant from each other.

Those who are disposed to test this apparatus will find it cheap and efficient.

SAG HARBOR, L. I., March 24, 1865.

PRACTICAL ITEMS.

BY H. S. CHASE, M.D.

ERO-VAPOR STOVE.—Under this name a small stove, heated by alcohol vapor, was sold by S. S. White about two years since. While alcohol was cheap I used it constantly in the summer for melting lead and zinc, heating vulcanizers, flasks, etc. etc. For the last year I laid it aside, on account of the high price of alcohol. About a month since I thought I would try benzine, which costs but eighty cents per gallon. I find that it works well; and a gallon of benzine will last longer than the same measure of alcohol. Any one who tries this stove will not willingly part with it.

TONGUE AND DUCT COMPRESSOR.—This instrument, invented by Dr. Hawes, is invaluable in filling under teeth. It does its work perfectly, allowing the operator the free use of his left hand for other purposes. I am using it with very great satisfaction.

LAWRENCE'S AMALGAM.—Those who use the above for plugging teeth complain of its hardening too slowly. An effectual remedy will be found by using one-fifth part of cadmium, scraped from an ingot. The cadmium also takes the place of a certain portion of mercury, which is readily squeezed out after the addition of the cadmium.

IOWA CITY, IOWA.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

REPORTED BY R. J. HOFFNER, D.D.S.

THE second annual meeting of the Odontographic Society was held Tuesday evening, May 16, President Dr. C. A. Kingsbury in the chair.

The Recording Secretary stated that during the past year nine meetings had been held, at nearly all of which essays had been read by mem-

bers regularly appointed. The names of members now upon the list number, altogether, sixty-eight. Of these, thirty-five are active, ten honorary, and twenty-three corresponding.

The following officers were unanimously elected for the coming year :—

President, Dr. James M. Harris. *Vice-President*, Dr. J. Foster Flagg. *Second Vice-President*, Dr. C. Sill, Pittsburg. *Corresponding Secretary*, Dr. J. H. McQuillen. *Recording Secretary*, Dr. R. J. Hoffner. *Treasurer*, Dr. Wm. A. Breen. *Librarian*, Dr. Wm. P. Henry. *Executive Committee*, Drs. J. F. Flagg, G. W. Ellis, Wm. A. Breen.

The delegates to the American Dental Association were chosen as follows: Drs. C. Sill, Pittsburg, Jas. M. Harris, Wm. P. Henry, C. A. Kingsbury, Geo. W. Ellis, R. J. Hoffner, Wm. P. Haywood.

The following gentlemen were unanimously elected members of the Society :—

Active Members, Drs. T. C. Stellwagen, S. S. Nones, Philadelphia, Jos. H. Borneman, Boyerstown, Pa.

Corresponding Member, Dr. W. H. Waite, England.

The retiring president, Dr. C. A. Kingsbury, delivered his closing address, which was received with marked attention.

MERRIMACK VALLEY DENTAL ASSOCIATION.

THE semi-annual meeting of this association was held in Lawrence, Mass., on Thursday, May 4th.

The following gentlemen of the profession were proposed and accepted as members: J. A. Perkins, D.D.S., Amesbury, Mass.; Drs. J. H. Kidder, E. D. Hayes, and E. A. Eaton, of Lawrence, Mass.; Wm. H. Noyes, of Newburyport; and J. Fisk, of Clinton.

Dr. Abr. Robertson, of Wheeling, Va., was elected an honorary member.

Dr. A. Lawrence stated that he had presented a remonstrance to Congress, in the name of this association, against the extension of the Goodyear Patents, which action was approved by the society.

The death of Dr. Wm. D. Vinal, of Lowell, Mass., was announced, and Drs. Boutelle, Kidder, and Johnson were appointed to present resolutions of respect. The committee attended to their duty, and reported as follows, which report was adopted.

WHEREAS, by the providence of the Supreme Ruler of the universe who controls the destiny of all, and doeth all things for good, our worthy and respected brother of the profession, Dr. Wm. D. Vinal, has been taken from our midst by death; therefore

Resolved, That while we reverently bow submissive to the high and imperative mandate of our Heavenly Father, we will endeavor to derive

consolation from the hopeful assurance that his appointed pilgrimage is completed, and that he is only called from the trials of earth to the enjoyments of heaven.

Resolved, That, as a society, we will cherish the memory of him whose death we now deplore, and as sincere mourners, extend our fraternal condolence to his bereaved family, fervently hoping that their sorrow may be lightened and their grief assuaged by commending them to the sovereign mercy of Him who gave and who has taken away.

Resolved, That these resolutions be entered upon the records, and that a copy be tendered to the family of the deceased.

The following gentlemen were elected delegates to the American Dental Association: Drs. A. Lawrence and G. A. Gerry, of Lowell; D. K. Boutelle, of Manchester; E. G. Cummings, of Concord; E. D. Hayes and E. A. Eaton, of Lawrence, who were empowered to send substitutes in case they could not attend personally.

Dr. Wetherbee, of Boston, presented the claims of the United States Dental Protective Union.

Dr. J. H. Kidder, of Lawrence, was elected essayist for the next meeting.

Conservative Dentistry was selected as the subject for discussion at the next meeting.

Dr. Kidder presented for examination two fine specimens of ossification of the nerve, also osseous union of teeth.

The subject of filling teeth was then discussed.

Adjourned, to meet at Concord, N. H., on the first Thursday in November.

G. A. GERRY, *Sec.*

NEW YORK SOCIETY OF DENTAL SURGEONS.

April 26, 1865.

THE following resolutions were unanimously adopted:—

WHEREAS, in the providence of Almighty God, the President of the United States, Abraham Lincoln, has been removed by the hand of violence from his high office;

Resolved, That this Society deplore the loss to the Republic of its great and good Chief Magistrate, and look with abhorrence upon the foul means of his death.

Resolved, That, as loyal Americans, we will maintain perpetually the cause of American Union and Liberty, to which Abraham Lincoln fell "a blessed martyr," and that we pledge our undivided support to President Andrew Johnson.

Resolved, That we deeply sympathize with the family of the late President in their great affliction, their loss being also ours; and that, as a

tribute of respect to the virtues and high position of the deceased, we will wear the badge of mourning for thirty days.

WM. C. HORNE,
C. P. FITCH, M. D., } *Committee.*
A. C. CASTLE, M. D., }

BROOKLYN DENTAL ASSOCIATION.

BY DR. WM. C. HORNE.

April 5, 1865.

Subject—VARIOUS PREPARATIONS OF GOLD FOR FILLING TEETH.

Dr. W. H. Allen has, of late, been using crystal gold very largely. A great complaint against it formerly had been its lack of uniformity, but that now offered to the profession is a greatly superior article. It requires more care and skill in using it than adhesive foil, particularly about the edges of the cavity. He prefers No. 2, with sharp, finely-serrated instruments, and carries the gold over the edge of the cavity. In peculiar cases he uses soft gold foil, which, as long as it lasts, is as good as any other. He tried the shredded gold, (recommended by Dr. Flagg,) and found it crumbly and weak, and more difficult to use than any other form of that material.

Dr. Abbott also uses sponge gold; it admits of a fine finish, with less labor; around the edges of a cavity he prefers to use adhesive foil; and also at the cervical walls, where, of all places, the greatest care is necessary to insure the perfectness of the plug. In small cavities the sponge gold is especially useful, as it does not come away with the instrument.

Dr. Marvin tried the sponge gold, when first introduced, and found that it did not wear well at the edges. He recommenced its use about two months ago, using adhesive foil for the bottom and sides of the cavity. He had now come to use it throughout the largest and most difficult cavities, having within the week filled a tooth, which took three-sixteenths of an ounce, with perfect success. He likes it for going into the smallest corner, and for the time saved in preparing the gold; it requires great care in filling around the edges of the cavity, and with this is as secure as a plug of adhesive foil, as hard, or harder, and easier to finish; in approximal cavities it is superior, as the gold does not come away with the instrument. The cavity must always be a little more than full before beveling the gold over the edges. A great deal in his present success with crystal gold he attributed to the superiority of its manufacture.

Dr. Latimer thought perviousness to fluids, the great fault of the first sponge gold plugs, might be due to the long, coarse points at first used; with those now in use the gold can be more perfectly condensed. We leave stronger tooth walls now, and have, probably, improved in our manipulation.

Dr. Francis had experimented with sponge gold, when first introduced, and had tried it again lately; he thinks that an eighth of crystal gold will fill more cavities than the same amount of adhesive foil; while it will not exclude moisture as effectually.

Dr. Mills is more pleased with the crystal gold the more he uses it; it is easier to finish off the surface of the plug, but it requires more care about the edges. He thinks it a mistake about the comparative quantity; is very successful in its use.

Dr. Hurd undertook to fill a tooth, and used up an eighth of crystal gold, and didn't succeed at that; so that it did not go further with him than foil; he supposed the difficulty with him was a want of skill. He sees some old-fashioned gold plugs which are equal to anything for durability; instanced Dr. Geo. E. Hawes' operations. We need to use all kinds of gold under different circumstances.

Dr. Clowes considered crystal gold as good as Watts' foil, and that is as good as can be. He paid a high tribute to Dr. Geo. E. Hawes, as one of the most deserving men in the profession; his work he pronounced excellent. Dr. Clowes referred to Dr. Arthur as a chum of his, at the Baltimore College, and wondered how it was we never hear from him now-a-days. He was a man who had done much for the profession—one whose name could never be forgotten as long as dentistry was practiced.

[It should be stated here that Dr. Clowes was not aware, at this time, of the presence of Dr. Hawes in the meeting.—W. C. H.]

Dr. Francis remembered well when, nine years ago, in the American Dental Convention, held in New York, Dr. Arthur described his method of operating with adhesive gold foil. It was then met with laughter and ridicule; but Dr. Arthur had lived to see his method universally adopted by the best dentists of the country. He believed Dr. A. was, at present, in practice in Baltimore.

Dr. G. E. Hawes being called for, said that he had kept crystal gold on his table for ten or twelve years. At first he filled some teeth with it, as he thought, successfully, but found it took him longer, and, as he saw no advantage in its use to compensate for the additional time consumed, he laid it aside. Two or three years after he found a case of a sponge gold plug, which he had to replace; how the others succeeded he knew not, but had never used sponge gold since. If there were any saving of time he would try it again. Dentists had two of the most beautiful materials to work with, gold and ivory, and, with good instruments, they ought to make good work. In conclusion, the doctor paid a handsome compliment to Dr. S. C. Barnum for the great assistance he had received from his adaptation of sheet rubber for excluding moisture from the cavities of teeth during the operation of filling.

BROOKLYN DENTAL ASSOCIATION.

At the regular meeting of the Brooklyn Dental Association, held April 19, 1865, the following action was taken:—

Resolutions on the subject of the death of Abraham Lincoln, President of the United States, being offered by several members, they were read and referred to a committee, who reported the following, which was unanimously adopted:—

Impelled by our great sorrow at the bereavement of the nation in the loss of its Chief Magistrate, under the inexpressibly painful circumstances of his release from earthly bonds,

Resolved, That, in token of the sincerity of our grief, we adjourn without the transaction of any ordinary business; and that we wear the symbol of mourning for thirty days. W. C. HORNE, *Secretary*.

AMERICAN DENTAL ASSOCIATION.

THE Fifth Annual Meeting of the AMERICAN DENTAL ASSOCIATION will be held at Chicago, Ill., commencing at 10 A.M., Tuesday, July 25, 1865.

CENTRAL NEW YORK DENTAL ASSOCIATION.

THE semi-annual meeting of The Central New York Dental Association will be held at Skaneateles June 20th.

S. G. MARTIN, *Secretary*.

IOWA STATE DENTAL ASSOCIATION.

WM. O. KULP, Corresponding Secretary Iowa Dental Society, in a circular which has been received, says that the next regular meeting of the Iowa State Dental Society will take place at Dubuque, beginning Tuesday, July 18, at half-past seven o'clock P.M.

The meeting is to begin one week before the meeting of the American Dental Association at Chicago. Many eminent dentists from abroad are expected at this meeting. Professor Taft, of Cincinnati, Ohio, has already consented to be there and give a public lecture during the session; and others have also promised to be in attendance.

The Society is entitled to one delegate to every five members of the Society, as a representation in the American Dental Association. For this reason it is desirable to have the membership increased. Delegates will be chosen at this meeting. All will have an opportunity to go to the Association, but only delegates are allowed to take part in the discussions.

Efforts are being made to get half-fare passages on steamboats up river to Dubuque, and also on the railroad from Dubuque to Chicago, so that dentists will have a better opportunity to visit Chicago and the American Dental Association than will again be offered for years.

Essays and Essayists appointed for the meeting :—

"Dental Etiquette," Dr. L. C. Ingersol. "Education of the People in Dentistry," Dr. Robinson. "Irregularities and Treatment," Dr. Magill. "Mechanical Dentistry," Dr. Nichols. "Facial Neuralgia," Dr. Brownson. "Pleasures and Perplexities in Dental Practice," Dr. Jackson. "Continuous Gum Work," Dr. Rawson. "Mounting Teeth on Gold Plate," Dr. Pearson. "Chemistry—Its Use in Dentistry," Dr. Hardman. "Who are Dentists?" Dr. Chase. "Care of Deciduous Teeth," Dr. Tulloss. "Filling Teeth by Mallet Pressure," Dr. Kulp. "Committee on Clinics," Drs. Chase, Kulp, and Robinson.

CONNECTICUT VALLEY DENTAL ASSOCIATION.

REPORTED BY L. D. SHEPARD, D.D.S.

THERE have been four meetings of the above Society since the last report in the DENTAL COSMOS; they have all been fully attended, and with increasing interest.

The Society has wrought a great work in the Connecticut Valley. Its membership has increased from meeting to meeting, until it now numbers fifty.

During 1864, three interesting meetings were held at Greenfield, Mass., Hartford, Conn., and Brattleborough, Vermont.

The latter was the annual meeting, and was held on the 11th and 12th of October.

Dr. O. R. Post, of Brattleborough, was elected president.

Drs. Beals, of Greenfield, and McManus, of Hartford, were elected vice-presidents.

Secretary Shepard, of Amherst, and Treasurer Miller, of Westfield, were re-elected.

Drs. Searle, of Springfield, Mass., Hall, of Windsor, and Jones, of Northampton, were chosen executive committee.

The retiring president, Dr. Searle, read an interesting paper on Professional Education.

The topics discussed were, Dental Fees, Mechanical Dentistry, and Anæsthetics.

Addresses were delivered by Drs. Hurlbut, of Springfield, McManus, of Hartford, Foster, of Shelburne Falls, and Shepard, of Amherst.

The last meeting was held at Springfield, Mass., on January 17th and

18th, 1865. There were over thirty members present. The principal time was devoted to the discussion of the topics, Dental Instruments and Dental Tissues.

The Society unanimously adopted the resolutions in regard to the time of pupilage, passed at the last meeting of the American Dental Association, at Niagara.

The next meeting will be held at Northampton, Mass., on June 13th and 14th, 1865.

The following were elected Essayists for this meeting:—

Drs. James McManus, C. S. Hurlbut, L. D. Shepard, H. M. Miller, O. R. Post.

The Society extended an invitation to Dr. J. H. McQuillen to meet with them at Northampton, and deliver an address.

Dr. McQuillen has accepted the invitation, and will address the Society on "The Anatomy and Physiology of Vision, with Practical Application to Dentistry."

All worthy practitioners are cordially invited to be present.

CONNECTICUT STATE DENTAL ASSOCIATION.

THE first annual meeting of the Connecticut State Dental Association was held in this city yesterday. This Association was organized some months ago, and embraces among its members nearly all the dentists in Connecticut. By its constitution, the annual meetings are to be held alternately at Hartford and New Haven, and the semi-annual meetings at such places as may be designated at the annual meetings. Dr. Hill, of Norwalk, presided; Dr. James McManus, of Hartford, was secretary. After the reports of the corresponding secretary and treasurer had been referred to committees, the following gentlemen were admitted as new members to the Association: John Cody, Hartford; G. B. Boutwell, Ansonia; A. E. Strong, New Haven; A. C. Peck, Woodbury; H. D. Sydenham, Norwich. Honorary members were chosen as follows: Wm. H. Atkinson and C. E. Francis, New York; Geo. A. Mills, Brooklyn, N. Y.; Henry M. Miller, Westfield, Mass.

Dr. Hill delivered his annual address, which was an able production.

On motion of Dr. Parmelee, it was voted that the rules be suspended and the present officers hold over to the next annual meeting. Voted that the semi-annual meeting be held for two days at New London, commencing on the first Tuesday in October.

Dr. Atkinson, of New York, delivered an interesting address on "the Means of Controlling the Flow of Saliva." Dr. Woolworth, of New Haven, read a paper on the "Past, Present, and Future of Dentistry."

Voted to publish the address of the president and Dr. Woolworth in the DENTAL COSMOS, and that one thousand copies be published in pamphlet form. Dr. Francis, of New York, stated that if the Association had any surplus copies, the Dental Association of his State would gladly take them. Thanks were returned the authors of the addresses, following which the president read a letter from J. H. Ashmead, Esq., inviting the members to meet at his residence at their convenience. The invitation was unanimously accepted, and the convention made the visit in a body last evening, and had a very pleasant social gathering.

Papers were read by Dr. Samuel Mallett, of New Haven, on "Patience in Dentistry," and by Dr. Sheffield, of New London, on "Controlling the Flow of Saliva," which contained much profitable instruction. Dr. Mills, of Brooklyn, gave an interesting account of his personal experiences in the profession, and was followed by Dr. Atkinson, who addressed the convention for over an hour, giving an exceedingly valuable discussion on the subject of "Malleting." He replied to all inquiries proposed by members, and spoke in detail relative to the treatment of ulcerated teeth.

Essays were read by Drs. Metcalf, of New Haven, and Sheffield, of New London, and addresses made by Drs. Mallet and Smith, of New Haven, and Francis, of New York, on the subject of filling approximal cavities. At the suggestion of President Hill, Dr. Charles W. Ballard, of Norwalk, State Senator from the 12th District, was elected an honorary member. He appeared and made an interesting speech. The subject of absorbents was discussed by Drs. Riggs, of this city, Stevens, of New Haven, and others. The following were appointed a committee to have the proceedings of the Convention published: Drs. Hills, Metcalf, and James McManus. Committee to revise constitution and by-laws: Drs. Crofoot, Sheffield, and Metcalf. Delegates to the American Dental Association, which is to be held at Chicago, July 25th, were appointed as follows: W. W. Sheffield, J. M. Riggs, E. E. Crofoot, L. Parmelee, C. M. Hooker, J. A. Pelton, F. C. Buckland, A. Hill, S. L. Geer.

Adjourned *sine die*.—(*The Daily Courant, Hartford, May 12th and 13th.*)

CENTRAL STATES ASSOCIATION OF DENTAL SURGEONS.

THE second annual meeting of the Central States Association of Dental Surgeons will be held in Louisville, at the Kentucky Medical College, commencing on Tuesday, July 18th, at 10 o'clock A.M.

W. H. SHADOAN, *Secretary.*

EDITORIAL.

PAIN IN DENTAL OPERATIONS.

THERE is no doubt that many patients can allow operations to be performed upon their teeth without regard to the amount of pain produced; but there are others who cannot nerve themselves up to bear pain, no matter what their will may be. There are others who cannot endure pain from *physical disability*. We have frequently referred to the propriety or policy of obtunding pain in sensitive dentine, and we daily have cases of the kind where patients have lost their teeth from a want of that precaution on the part of their operators; but such practices cannot be corrected or ameliorated as long as dentists remain insensible to their moral obligations to their patients. A distinguished lady, for whom we have been operating for a number of years, and whose teeth were and still are extremely sensitive when the least decayed, had lost many of her teeth, under a distinguished dentist, from defective operations, owing to the exquisite sensibility of her teeth, and neglect, on her own part, from fear of the pain while undergoing operations of plugging. Since she has been under our hands she has not lost any teeth. As her natural teeth are wearing out, it was suggested that some artificial ones might be placed in the mouth to aid mastication, as well as save the wear of her own. She lamented the loss of so many of her teeth in early life, but she told her dentist she would rather let them go than have any more pain; that the nervous system had given way under the operations, and she could bear no more. She said she was in debt to us for all her remaining teeth, and she never would forgive her dentist, or forget the pain she had suffered. But there is another class of patients, to which we wish to draw special attention: and while they may be few and far between, they accumulate finally in the hands of old dentists, if they be competent to treat them properly. The following is one of a marked character: A lady, about thirty-five years of age, of a high, sanguine nervous temperament, eyes blue, skin extremely red, full habit, color of the face varies upon the slightest emotion, was attacked, when about sixteen years of age, with spasms of the muscular system, but never lost consciousness. The ringing of bells and the rattle of fire-engines in the street would throw her into spasms. It often required four or five persons to hold her; it was attributed, by her medical advisers, to congestion of the spine. About this time her teeth commenced to decay; but, the dentine being very tender, she could not bear the cavities to be cleansed out for plugging; consequently she lost her teeth, one by one, until all the upper set were lost and artificial ones supplied, and all the lower ones but the front incisors, canines, and first bicuspid. About

five years since she fell into our hands to get an upper set of teeth ; she was in remarkably good health in every other respect. We found the bicusps and canines were slightly decayed ; we placed in an upper set of teeth, but she would not let us try to plug the rest. She was about going to Europe to try some celebrated springs for the spasms. Nothing seems to mitigate the violence of them. At last a nerve became exposed in the right canine tooth. On her return from Europe—about four years ago—she wished it extracted. This we declined, and, with great reluctance, let us try to kill the nerve. We destroyed the pulp and plugged it, but we were obliged to remove the plug, as alveolar abscess was threatened. When the irritation subsided, we drilled the neck of the tooth and plugged the external cavity. This tooth is, up to this time, in a good state of preservation, and remains comfortable. Sometimes the drilled orifice is opened with a quill dressed down to a point. Since that time, and, from time to time, we have plugged both of the canine and bicuspid teeth, as we could persuade her to let us try. If the nerve or dentine is touched, it throws her into slight spasms, but she cannot bear the file at all. By destroying the sensibility of the dentine with arsenic, and excavating the decay without much pain to the parts, we succeeded in making very good plugs. Sometimes when she calls, and we find that the system is very impressible, we send her away, and in a few days she comes back, and we try again. Sometimes a few strokes of the instrument only are made, and the patient sent home to call again. Now she knows when she is best able to bear operations, and calls accordingly. Since she has thus been treated, she is perfectly satisfied that if the same treatment had been pursued long ago, she could have saved her teeth ; besides, every operation that is performed the better it is borne, as she gains confidence. This is purely a case of physical disability, disregarded by the dentists whom she had been under, from time time, for dental operations. Would it not be better to treat those cases where patients cannot bear pain with indifference, purely as cases of physical disability, than to appeal too much to their moral courage ? We have hundreds of cases where the moral courage has carried patients very well through painful operations for years, but who at last lose confidence and succumb, and give up, and cannot be persuaded to try any more ; but we have never known a single case of a patient ceasing to have operations performed upon his teeth, no matter how sensitive they were at first, if the sensibility was always obtunded before operating ; but, on the contrary, many timid patients, and those who could but feebly resist pain, became quite heroic, and at last bear a good deal of pain from confidence gained by repeated successes. We have been acting upon this principle, and have never met with a case in which we failed to accomplish what we desired ; besides, it makes it more agreeable to the dentist than to

have his patient shrinking and shedding tears under his hands, and looks, at least, a little more as if science had achieved something, and that we were advancing a little in civilization.

J. D. W.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

FISTULA.—The inexcusable ignorance sometimes manifested by medical and surgical practitioners, of the pathological conditions induced by carious or devitalized teeth, fully justifies the animadversions that patients naturally indulge in under such circumstances. It is bad enough when such want of knowledge causes only temporary inconvenience or a limited amount of suffering, but it is still worse when a patient is compelled to suffer for years from the presence of an unsightly swelling, or to have the most unpleasant apprehensions of the nature of the disease aroused by the imagination of unprincipled charlatans, from the fact of having applied in vain for relief to respectable medical practitioners. As a case in point in illustration of this: A young woman was sent to me by Dr. Richard J. Levis, formerly Editor of the *Medical and Surgical Reporter*, with the request that I should examine her teeth, and ascertain whether a fistulous discharge which was constantly flowing from under the chin was not caused by the inferior central incisors, which were necrosed, of a dark-blue color, and quite loose. The examination satisfied me of the correctness of his diagnosis, and of the treatment he favored, viz., the extraction of the teeth, which was done by me at once. The history of the case, as presented by the patient, was more interesting to others than satisfactory to herself. Some twelve years before, she had injured these teeth by a blow or a fall. A short time after this, a swelling of considerable size appeared under the chin. This continued to annoy her for a considerable period, not so much on account of pain as inconvenience from the size of the swelling and the consequent deformity. In this condition she applied for relief to an eminent surgeon, who, on a careful examination of the swelling, pronounced it a *tumor*, and proposed its removal. This, however, was not attempted; but shortly after the *abscess* broke, and the fistulous discharge was established. In this state she applied to a quack, who pronounced it a *cancer*, and proposed to treat it for a stipulated sum, which was to be paid in advance. Fortunately for her, she decided not to have anything to do with this person, but sought instead the advice of Dr. Levis. The removal of the teeth has been followed by the most favorable results, the fistula disappearing in a

few days without any other treatment—an operation, by the way, which some may object to, but which my experience and judgment fully justified in such a case.

FACIAL NEURALGIA.—An interesting case of this terrible affliction came under my notice, a few weeks back, in a patient sent to me, in consultation, by Dr. Thos. G. Morton, Surgeon to the Pennsylvania Hospital. The patient, who is aged about sixty, has suffered, for the past twenty years, the most excruciating pain in the right side of the face, generally commencing in the region opposite to the *infra-orbital* foramen, and radiating from this point to the various parts to which the nerves passing from the foramen are distributed, viz., upper lip, ala of the nose, and lower eyelid. The paroxysms, as a general thing, make their appearance with a tickling or pricking sensation of the cheek, which increases in severity until the pain becomes most agonizing and unendurable. During the extended period in which he has been a victim to this fearful malady, recourse has been had to all the medical agents that science has recognized as valuable under such circumstances, but they have proved of no advantage to him. A short time since all the teeth in the right superior maxillæ were extracted, under the impression that their removal would prove of advantage; the only result obtained, however, was to deprive him of a number of excellent masticating organs (for they were all perfectly sound) without securing any amelioration from his sufferings. It was some months after this that he called upon me. After listening to the description of his sufferings, and making a careful examination of his mouth and face, I informed him that the disease he labored under evidently had its origin in the upper jaw, the pain being due to compression of a branch of the second branch of the fifth pair of nerves in the infra-orbital canal, from osteal or periosteal thickening of the parietes of the canal; and that the only plan by which he could obtain relief was to submit to the trephining of the jaw, so that the portion of compressed nerve could be removed. In a subsequent interview with Dr. Morton, I found he had formed the same opinion as that expressed above, and proposes to perform the operation at the earliest moment possible. The success which Carnochan has met with, in the three cases described by him, fully justifies the performance of such an operation.

No one can have a proper conception of the terrible character of this affliction, unless he has witnessed the manifestations of suffering, on the part of a patient laboring under an attack; then the writhing form, the rolling eyes, the streaming tears, the quivering features, and the constant cries of anguish, prove that the pain is fearful in the extreme, and very, very hard to endure.

The most forcible description that has ever been presented of the sufferings of a victim to this terrible scourge is contained in the following letter, taken from Carnochan's *Contributions to Operative Surgery and Surgical Pathology*.

"In the year 1811, a letter appeared, in the *Philadelphia Medical Museum*, written in 1807, by Dr. Jones, an eminent physician, of that time, in the City of New York, and addressed by him to the celebrated Dr. Benjamin Rush. This letter is a statement of Dr. Jones' own case, he having been, for many years, a victim to intense neuralgia of the face. The narrative is drawn up with much clearness of expression, and is worthy of insertion here, as emanating from a highly intelligent source, and as presenting a most graphic description of the excruciating and fearful agony experienced by those who are afflicted with the intense form of this disease.

"Dr. Jones' letter runs thus:—

"NEW YORK, Oct. 15th, 1807.

"About the middle of July, 1806, I began to feel an uneasy sensation in the gum of the upper jaw, on the right side, at a point whence one of the molares, in a loosened state, had a long time before been taken away; the socket of which, however, had already been absorbed or filled up, and the gum, or alveolar border of the jaw, was even, firm, and apparently sound; yet whenever I washed my face, or moved my hand gently over the cheek, a latent disease was perceptible. It gradually increased, till it became so extremely painful, that at times I was compelled to cry out with the intolerable anguish it occasioned. Eating, drinking, speaking, hawking, and spitting, sneezing, coughing, and blowing the nose, would either of them, in a moment, awaken the most poignant and acute pain. Even touching the eye with the finger, slightly rubbing the forehead, putting on a pair of spectacles, or only opening the mouth wide, would excite a return of the pain. Taking into the mouth anything hot, cold, or acid, was sure to produce the effect with aggravated violence. The necessary mastication forbade the use, in a great measure, of solid food. Combing the hair, shaving the right corner of the mouth, reading aloud, or anything that gave the slightest motion to the muscles of the face, would occasion in the part a throbbing, which seemed to begin like the vibration of a musical cord, extending its effects to the cheeks, the eye, the nose, up to the scalp on that side of the head, and, after continuing for a few seconds, sometimes a few minutes, and latterly for fifteen or twenty minutes, it would cease, and the part which had been affected would then feel as well as if nothing had happened. The pain at length began to be felt severely, upon touching the left eye, yet, whatever it was that excited the pain, it always centered in the gum, on the right side of the upper jaw.

"It continued in this way, except increasing in the duration of each, paroxysm, till August 28th, 1807, when it almost, or entirely left me, and I began to flatter myself it had been vanquished by the use of hemlock; but in two or three days it returned, and became as violent and excruciating as ever. The gum where the disease is seated, I have already mentioned, is to all appearance perfectly well, sound, and smooth, with no visible vestige of disease about it; and there had been no tooth in the

spot for some considerable time before the disease commenced. The gum has been repeatedly divided by numerous longitudinal and transverse incisions down to the bone. This operation, in the beginning of the complaint, never failed to assuage the pain for a time; but the relief seldom lasted till the gum had healed. Electricity was tried for a long time, to no purpose. A number of topical applications were made; the part was covered with a blister externally, and various embrocations applied to the cheek without advantage. Opium was taken in large quantities, and the tincture applied to the part, both externally and internally. Warm and cold bathing were alternately applied to the head and face. The latter application occasioned the most exquisite misery. Peruvian bark in substance was taken in large doses. Huxham's tincture of the bark, with wine, was used very liberally. The volatile alkali, in a decoction of bark, was taken agreeably to Dr. Fothergill's prescription, in a recent publication of the *successful* treatment of a case of this very formidable disease. None of those things effected any change that promised the final removal of the complaint. I then began a steady use of the extract of hemlock, taking one grain night and morning, till I had risen to the quantity of fourteen grains every four hours. This was continued till September 22d, 1807, when, finding it produced no diminution of the pain, I omitted the use of it for one week, when, the pain recurring more frequently, as well as more severely than before, I again had recourse to the hemlock, and am now, without much benefit from it, or very sanguine hopes in its curative efficacy, still persevering in the daily use of it. I have been advised to have the actual cautery applied to the gum; but am apprehensive that so harsh and violent an application would bring on tetanus with all its alarming and distressful consequences, and have therefore concluded not to adventure upon the experiment.

"This complaint will be admitted, I presume, to be a nervous affection; but what remains mysterious, and seems to ask for explanation is, that if a local disease, cutting the gum all to pieces, dissecting and dis-severing it in all directions, should not, by dividing the nerves and insulating them from all connection with the sensorium, destroy their sensibility, or at least their power of *communicating* pain. I am aware that while their continuity is preserved, denudating the nerves, so as to expose them to the contact of the common air, does often cause them to assume a morbid action productive of extreme pain; but this did not happen in the present instance, for, when the scarifications did least good, they did not seem, in the smallest degree, to increase the evil.

"I am upwards of sixty-two years of age, and, except this complaint, my general health and appetite are good; I have, indeed, a small ulcer in one of my ankles, which has been healed, but from irritation has broken out again, and at present does not seem much disposed to cicatrize. I have, during my whole life, been in the habit of using steady exercise, and have lived as regularly and as temperately as any man.

"If, sir, on considering this case, which has thus far eluded the best professional skill of this city, anything occurs to your mind, which would throw light on the nature and character of my complaint, and especially if your extensive research and experience should have furnished you with anything promising for the treatment of it, by communicating your opinions and prescriptions, you will not only give to the world a new proof of your pre-eminent skill, but you will at the same time subserve

the interests of humanity, by administering comfort and relief to an old man, suffering under the most afflictive distress; you will cause his winter sun, now dimmed and clouded with despondency, to shine out afresh, with a mild and cheering ray, and at last go down in a serene sky; and, what may be of still more value in your estimation, you will enjoy the conscious merit of acting in conformity with the benign precepts and bright example of the *Great Physician*, who, while on earth, delighted in relieving the distresses of his brethren.'

"Dr. Rush replied to this letter, recommending such remedies as he supposed might be most effective in arresting the fearful disease. We learn, however, from the following extract, taken from another letter to Dr. Rush, written two years after the one just quoted, that all the remedies which were used had proved unavailing. Dr. Jones, in his second letter, dated December 9th, 1809, thus alludes to his condition at that time. . . . 'My disease, sir, still maintains its place, unmoved by all that weight, and force, and complication of machinery which medical science and skill have devised and applied. The most promising and judicious prescriptions, derived either from enlightened reasoning, or from experience, or from learned research, have alike failed, in this baffling disease, to answer the expectations reasonably entertained of them.'

"I am informed by a venerable and esteemed physician, still living in this city, that Dr. Jones was afterward subjected to the operation of division of the infra-orbital nerve on the cheek, but without receiving material benefit; and further, that, unrelieved by any of the curative means he had so patiently resorted to, he succumbed under the prolonged and agonizing suffering which he had endured."

SOAP IN PLACE OF OIL ON ARKANSAS STONES.—The employment of oil for the purpose of keeping Arkansas and other stones in proper condition for sharpening instruments is so general as to be almost, if not entirely, to the exclusion of every other substance. The tendency, however, to become gummy, and clog the surface of the stone after it has been on a short time, along with the liability of soiling the fingers and imparting an unpleasant odor to them, makes the use of oil in the office objectionable on the part of the dentist. All this can be readily obviated, however, by using soap in place of oil, as follows: Rub a piece of toilet soap and a little water over the surface of the stone until a thick lather is formed, and then allow this to dry. When occasion arises for putting an edge on an excavator, a few drops of water will moisten the soap, and place the stone in proper condition for use at once. This plan is one that I have employed for years, and would recommend a trial of it, on the part of others, in place of the substance generally used.

THE PEOPLE'S DENTAL JOURNAL—OCTOBER.

"TRIALS OF A DENTIST.—There is, perhaps, no pursuit in life wholly

exempt from perplexities, discouragements, and heart-burnings, and none, perhaps, that do not require, to some extent, sacrifices and heroic self-denial. But, in all the avocations of life, we believe there is not to be found a man who is called upon so imperiously to exercise so many and varied Christian virtues, as the dentist. He must be civil, patient, kind, amiable, charitable, forbearing, tolerant, forgiving, sympathetic, humane,—everything, in short, that distinguishes a Christian gentleman. He is called upon to practice these and many other virtues, not alone as convenience or inclination or interests may prompt, but, unceasingly and under all the varied and trying circumstances of his laborious life, he must place them under contribution and make them do willing or unwilling service. We hold in high estimation the Christian resignation and patient endurance of Job, but on the score of trials, at least, there is scarcely a dentist in the land who may not lay honest claim to equal distinction with his illustrious prototype. That it costs a dentist something to be a Christian gentleman, can, perhaps, be made to appear, from a brief description of what may, and often does, occur in a single day's experience.

"Mrs. A. has an engagement at nine o'clock in the morning. With a knowledge that the operation to be performed will occupy about one hour, a sitting is appointed for Mr. B. at ten o'clock. Mrs. A. makes her appearance half an hour behind time. The delay is explained to the patient's entire satisfaction. A neighbor dropped in and detained her,—or, wanting some trifling article at the store down town, thought she would just make the purchase on the way to the office—didn't suppose a few minutes would make any difference. You tell her you have but half an hour's time at your disposal, and that it will be impossible to finish her work in time for your next engagement. Patient, somewhat piqued, coaxingly urges you to undertake it, reminding you that she has a sick child at home,—or friends visiting her,—or her servant has left her and she is without help,—or something of the sort that will make it impossible or very inconvenient for her to return. You are persuaded to give her the chair in the forlorn hope that Mr. B. also may be a little behind time. But Mr. B. is a punctual man of business, and at precisely ten o'clock rings the bell, and is admitted. His time is valuable to him, and his absence from his duties involves inconvenience, and possible loss. You have hurried your first patient's work with all proper dispatch, and only find it finished at a quarter-past ten. You are on the point of dismissing her, when your attention is called to some particular tooth which she merely wishes you to *look* at—'it wont take a minute.' You examine it with a little irrepressible impatience, and give your opinion. 'Now, doctor, will you please just look at this tooth far back in the lower jaw, and tell me if you think anything can be done for it,' and with the corner of the mouth drawn back to facilitate your explorations, you cannot refuse to look into the mouth without giving offense. The examination is made under protest, but the patient is inexorable. The case is a complicated one, and the time at your disposal will not admit of any definite opinion. You ask her to call again and you will be more particular in the examination. You begin to experience a slight sense of relief in the reasonable expectation that now, at last, the chair will be given up, but you have cherished a delusive hope. That tooth has a long and tragic history, and with most provoking and audacious coolness, she plunges at once into particulars, until, in an agony of impa-

tience, you are compelled to exclaim, 'Madam, at another time I shall be happy to give your teeth a careful examination, and hear all you have to say, but I must ask you now to yield the chair to a waiting patient who has been entitled to it for the past twenty-five minutes.' You will have cause for self-congratulation, if it does not come to your ears afterward, that this patient felt aggrieved, and considers you very disobliging if not positively uncivil and churlish. You now proceed to wait upon Mr. B., but find he has left the office in search of another dentist who is more faithful to his engagements.

"In his place, however, you find a poverty-stricken, suffering patient, whose appearance precludes the idea of a fee. You extract an aching tooth. The patient, grateful for the service rendered her, makes diligent search of a soiled and worn purse, and hands you all—it may be twenty, thirty, or fifty cents. You hand it back, saying, 'I will make you no charge for this.' How opportune this patient's presence! There is no anodyne so good for disordered nerves as the performance of a charitable act toward one of God's worthy poor. You have almost forgotten your previous vexation in the fervent 'God bless you, sir.'

"Your next patient is a nervous, timid person, who wishes to have some teeth filled, but has deferred it for a long time through ill-grounded apprehensions of suffering all the tortures of the Inquisition in the operation; besides, she is very doubtful whether filling the teeth will save them after all. You have just succeeded in reassuring her, and secured her confidence with respect to the permanence and value of good dental operations, when another patient is introduced, who unceremoniously salutes you with the impatient and fretful exclamation, 'Doctor, the filling you put in for me the other day has come out. Are all my fillings going to tumble out in this way?' Your cheek, for the moment, flushes with just indignation at this thoughtless and injurious speech in the presence of others who know nothing of the circumstances of the operation, but you must *act* the Christian gentleman, and pocket the affront. The circumstances were such as preclude explanations, and unable, therefore, to disabuse the minds of listeners of the false impressions conveyed, they are permitted to leave your office either with their preconceived notions of the worthlessness of dental operations confirmed, or that you are a very careless or a very bungling operator. Though we could not explain in the presence of our patient, we may now to our readers. The cavity filled was, under any circumstances, very difficult to shape properly, but was rendered much more so by extreme sensitiveness. Every cut of the instrument you made, was done in the face of importunities to desist. At length, yielding in a spirit of conciliation and compassion, as the patient's exclamations became more and more impatient and irritable, you desisted just at a point where a few more cuts of the instrument, courageously endured, would have made your filling perfectly secure. Under such circumstances, the petulant and ill-timed salutation 'are all my fillings going to tumble out in this way?' could scarcely be construed as just or generous, but your patient is a *lady*, and has claims upon your forbearance.

"The after part of the day finds you engaged upon an unusually difficult and perplexing operation, taxing, to the last degree, alike your skill and endurance. An hour or more has been occupied in filling a cavity unfavorably located, and illy formed, and all this time your attitude

has been a strained, wearisome, and, at times, a painful one, while the mind has been unceasingly occupied with intense anxiety and apprehensions. The moment of the completion of the operation is one of inexpressible relief. A little rest for yourself and the patient, and you proceed to finish the filling. As the work of your hands, under file and burnisher, grows in artistic beauty, reflecting the instrument upon its polished surface, you almost forget your weariness in the conscious pride and satisfaction of the beautiful creation of your genius and skill. It is the dental artisan's crowning triumph. A last and critical examination of your work is made, when, alas! with all your care and skill and weariness, and with the old glow of gratified pride and satisfaction still lingering upon your face, a weak point is discovered,—a little, inappreciable, incomprehensible thing to all others, but a radical, fatal defect to the practiced eye and informed judgment of the true artist and accomplished expert. It is irremediable. No repairing—no patchwork will answer. The filling must come out bodily if you would be just to yourself and patient. Discouraged, and nervous with vexation and weariness, no choice is left you but to go over your work, and labor on again through two more mortal hours without thanks or remuneration.

“And so on through a life replete with daily trials of temper and patience, of courage, faithfulness, and endurance. What we have sketched are but feeble examples of the every-day experiences of a dentist. We have neither space nor ability to portray what every dentist is continually called upon to endure. While patients may justly demand at his hands the exercise of patience, sympathy, forbearance, and humanity, they, also, by every consideration of justice, should extend to him who honestly strives to render to them services of inestimable value, considerate, charitable, and generous treatment.”

“A NEW DETERGENT.—A new natural product of California, possessing deterative properties, is thus described by a contemporary:—

“A few months ago, some persons engaged in making turpentine, in Plumas County, tapped some pine-trees of a species new to them. The fluid flowed abundantly, but it had a peculiar odor, and, when taken to the turpentine stills in the neighborhood, nothing could be done with it. At last it fell into the hands of a man who managed to distil the liquid, which proved to be a new discovery. Instead of the disagreeable odor of turpentine, it has a fragrance like citron, and is free from all resinous matter.

“Ten gallons of it weighed as much as six gallons and three quarts of pure water. It dissolves all animal and vegetable oils, and leaves no stain of its own, nor does it affect any of the colors used in dyeing; and thus it is an excellent substitute for benzine, without the odor which makes the latter substance so offensive. It is also much cheaper than benzine. The new liquid is called ‘Erasine,’ because of its value for cleansing. It evaporates rapidly, and burns well, but is more expensive than coal oil. This novel product of California is now in market.”

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Food.—The potentiality of food, in both its material and dynamical aspects, is a subject of such vital importance as to merit the most profound investigation, and we are glad to see the increasing intelligent research for its elucidation, as it will tend to demonstrate more clearly the necessity for proper alimentation to insure normal life-action; for there can be neither physical nor moral health unless each cell, tissue, and organism receives its specific pabulum, it being essential to their perfect development and the due performance of their functions. In this connection the following, from the *Lancet*, is of especial interest:—

“A few evenings since, the Professor of Chemistry at Edinburgh, DR. LYON PLAYFAIR, discoursed at the Royal Institution of London on a subject particularly interesting to the scientific physician, and to which, in some of its aspects at least, allusion has already been made in this journal. Dr. Playfair entitled the subject of his lecture, ‘The Food of Man in Relation to his Useful Work.’ The chief object of the lecturer was to examine the function of nitrogenous ingredients of foods as a magazine of force for the production of dynamical effects in the animal body. The consideration of the latter as a machine and of the food in the light of fuel supplied, our readers may remember, has already engaged the attention of scientific men, and to it we have previously drawn attention. Rumford, Joule, Mayer, Helmholtz, Dumas, Hern, Fick, and Carpenter have written upon it; but all of them have worked upon food in its aggregate, applying their calculations to the total carbon and hydrogen contained in it, without discussing the influence exerted by its separate constituents in the production of force. The Rev. Dr. Haughton, of Dublin, however, has gone further. He has endeavored to find in the urine the representative of the mental, vital, and mechanical work of the human body, and gives the following equations:—

Opus mechanicum, or 150 lbs. raised one mile... = 136·5 grs. of urea.

“ *mentale*, or five hours of study..... = 217 “

“ *vitale*..... = 297 “

Now Dr. Playfair assumes (for reasons we cannot enter into here) that Dr. Haughton cannot have meant these equations in the mathematical sense of equality, but only in the general sense of representation. He is, therefore, obliged to class Dr. Haughton with those investigators who consider that the transformation of the nitrogenous tissues is insufficient to account for the dynamical movements of the body. Under these circumstances Dr. Playfair undertook to consider the subject entirely anew. In doing so he arranged the discussion under three divisions. Under the first, he sought to ascertain the amount of food necessary for mere subsistence without exercise; to determine the amount required for complete health, with moderate exercise of from five to seven miles daily; to fix the amount suited for active work, such as may be represented by a man walking twenty miles daily continuously; to find the amount of food consumed by laborers with very arduous occupations, such as navvies

engaged in railway construction. Having ascertained these preliminary facts, which may be said to be altogether independent of theory, the Professor passed to the second division, under which was discussed whether there be sufficient potential energy in the nitrogenous tissues or of the food representing them, and in the oxygen required for their transformation, to account for the dynamical actions within or without the body. It was next inquired whether the fatty and amylaceous or saccharine ingredients of food are employed in this mechanical work. These points having been disposed of, the third division was entered, under which it was considered whether the excretions of urea and uric acid per vesicam are sufficient representatives of labor performed. Finally, it was sought to be ascertained what is represented by the nitrogenous materials excreted per anum. To a few only of the many important generalizations arrived at by Dr. Playfair can we here make allusion. This, however, is the less to be regretted, as we believe that a full report of the lecture will be published in a short time.

"It was shown that we must look to the plastic ingredients of food as exponents of dynamical action both internal and external to the human body. When we contrast the useful work of a steam-engine with the potential energy supplied to it, the economy of force on the part of the man appears surprising. Even on the rough mode of calculation available to Scoresby, Joule, Dumas, and Helmholtz, before our knowledge of dietetics had enabled us to consider the question in a more precise way, the relative economy of the human machine excited surprise. And yet it is now known that our demand for economy is much greater than was then supposed to be necessary, and that we actually require that more than half of the potential energy should be converted into useful work. Numerous facts prove that transformation of muscle through the agency of oxygen is the condition of muscular action. Most likely intermediate products are formed before the final forms of carbonic acid and urea are reached. If these graduated changes take place in the muscle itself, the same amount of potential energy will be available as there would be if the simplest forms of oxidation were reached at a bound. If lactic acid be the intermediate product of oxidation before carbonic acid, its passage into the latter must be very rapid, for that is constantly eliminated from a muscle during its action. And if we thus constantly find that carbonic acid, the highest oxidized form of carbon, is manifested in the substance of muscle during its activity, it is certainly to be expected that the less oxidized form of amido-carbonic acid should be simultaneously produced. In those cases of disease where elimination of urea is retarded it is found abundantly in the muscles. Thus, in cholera, especially in the muscles which have been severely cramped, urea is detected with ease. In this disease there is a small amount of chloride of sodium in the blood, and its solvent action on the urea is thus reduced. In anæmia, also, it can be readily extracted from muscular substance. From the considerations entered into, it must be held that Liebig was amply justified in viewing the non-nitrogenous portions of food as mere heat-givers. They never can act vicariously for albuminous bodies as tissue-formers, although tissues may and do evolve heat by transformation when required to do so. That heat-givers do operate indirectly on the waste of tissue cannot be questioned. They facilitate transformation by keeping up animal heat and by promotion of the circulation. Cold-blooded reptiles become more active when artificial

warmth is supplied to them, and conversely warm-blooded mammals become more sluggish when the heat of their bodies falls, as during hybernation. Such dependencies of different groups of food, acting co-ordinately, are incessantly found, but nevertheless each group has its own specific work to perform.

"There cannot be longer any question that all the nitrogen of the ingesta is to be found again in the urine and fæces. When a large amount of animal diet is the chief source of food, exercise becomes a necessity in order to waste the tissues for the support of respiration and other vital movements: without it the animal soon loathes the food. This is the experience not only of carnivora, but also of man. Darwin tells us that when in the Pampas he lived tolerably well on a meat diet, 'but felt that it would only agree with him with hard exercise.' We are informed that the Guachos, who live upon meat, eat largely of fat; probably not only for respiratory food, but also as a protection against unnecessary muscular waste, as may be explained. Sir John Richardson observed the same fact in his Arctic travels, having noticed 'that when people have fed for a long time upon lean animal food, the desire for fat becomes so insatiable that they can consume a large quantity of unmixed and even only fat without nausea.' The hyena in confinement wastes its tissues by moving backward and forward incessantly in its den, and thus is able to consume its animal diet. All this shows that the normal function of nutrition is to build the plastic food into tissues, to be transformed by internal and external dynamical work into carbonic acid, water, and urea. The measure of the digestive or assimilative work in a man of healthy digestion is to be found in the nitrogen of the fæces. One-twelfth of all the plastic food taken by man is converted into digestive ferments, and then is excreted per anum. Finally, we would add that the Edinburgh Professor is not inclined to agree with those physiologists who consider that these 'ferments' secreted from the blood are the degraded products of tissue-waste in their passage to urea. On the contrary, he believes them to be merely albumen of the blood, the oxygenation of which is incipient, so as to make it ready to build up tissue, as in its passage to fibrin. Hence, when there is an extensive demand on the blood for tissue-material, as in the case of work in excess of the food supplied, (for instance, as observed by Dr. Edward Smith with over-worked prisoners,) there the amount of the alvine defecation diminishes."

"*On Nutrition.* By LIONEL S. BEALE, M.B., F.R.S., Fellow of the Royal College of Physicians; Physician to King's College Hospital; Professor of Physiology and of Morbid Anatomy in King's College. (Continued from page 576.)—I have endeavored to show that in all cases the tissue or structure of a living being is composed of matter which *lives* and matter which *has lived*, and that in the first *vital changes* as distinguished from mere physical and chemical phenomena occur, and that this living matter alone is essentially concerned in *nutrition, formation, and growth*. This living matter is all-important in the changes occurring in all parts of the body in health and disease, and it differs from matter in every other known state, in its power of converting new matter into matter like itself, and of communicating to it powers and properties in all respects similar to those it possessed before the new matter came in contact with it. Every kind of living matter known is colorless, and possesses certain characters in common with other kinds, but there is the

greatest difference in power—a difference which cannot be accounted for by difference in chemical composition, or attributed solely to the conditions under which life is carried on, etc. It has been suggested that since this apparently simple, colorless, soft, plastic matter endowed with all these wonderful powers consists of nothing but a little carbon, hydrogen, nitrogen, oxygen, with one or two other elements of less importance, in some peculiar state of combination, it may be possible to discover the conditions under which these simple elements may be made to combine, and so to form artificially a particle of living matter! If, however, we consider the actual processes which occur in the nutrition of the simplest living particle, or if we observe for ourselves the changes which may be seen in living matter under the higher powers of the microscope, as in a mucus corpuscle or a pus corpuscle, we shall be led to study and investigate still further the wonderful phenomena which characterize living matter, and the nature of the changes which occur in the process of its nutrition; and we shall soon be convinced that the vague and oft-repeated assertions with reference to the identity of *vital* with chemical and physical actions rest upon no scientific foundation whatever; that they are opposed to the results of careful observation and experiment, and have arisen from a most incomplete examination of actual facts, many of which are open to the observation of all.

“The third stage of the process of nutrition comprehends the conversion of the living or germinal matter into *formed material*, which is added to that already produced. I have endeavored to show that the formed material results from changes in the germinal matter. It seems probable that particles of the germinal matter, after going through certain stages of active existence, lose their active powers or *die*, and that the formed material results from this death. The ultimate atoms of the germinal matter are constrained during life to occupy such relation to one another that at death they enter into combination to produce the peculiar formed material, among perhaps many other substances. The former would be deposited in an insoluble form, while the latter would pass away in a state of solution in water from the cell.

“The composition and properties of the formed material necessarily depend upon the relations the elements were made to occupy or take up during life, and this is determined, I think, by that agency, force, or *power* which we are compelled to admit, and this I speak of as *vital power*. No *force* known can compel elements of matter to take up different and special relations to one another at the same temperature in the same animal, or effect the rearrangement of the elements of the same pabulum so as to give rise to the production of such very different compounds as occurs in the case of different cells in the same organism. But, as I have before said, if any chemist or physicist should offer a reasonable explanation of the results occurring in different cells of an organism—nay, in any one living cell—without assuming the existence of some such peculiar agency or power distinct from ordinary force, his view would be at once received, and all would thenceforth cease to speak of vital power as distinguished from physical force. Hitherto, however, no chemist or physicist has ventured to discuss what really takes place in a single cell. Nay, I cannot help thinking that there is a strange indisposition on the part of those who have expressed themselves most strongly in favor of the physical force theory of life to discuss the question at all, or to answer the objections raised to their statements by physiologists.

"The formed material, having resulted in the manner above described, is incorporated with that already produced, or it is added as a distinct layer within previously existing layers. In the former case it will appear more or less homogeneous; in the latter, it will exhibit concentric markings; or it may be deposited so as to form distinct capsules one within the other. The outermost portion of the formed material is often ragged, and not unfrequently is seen to be undergoing disintegration. Sometimes it serves as a nidus for fungi, which live and grow at its expense, as may be seen in the case of the old epithelial cells upon the dorsum of the tongue.

"The consistence of formed material varies greatly. It is always soft when first found, but becomes very hard in many cases, owing to the absorption of water and to other changes. Sometimes it remains soft, like ordinary mucus; and sometimes it is diffuent, and is carried off as fast as it is produced.

"The formed material of a cell may then accumulate as the cell advances in age, in which case this part of the cell (formed material or tissue) is said to *grow* as age advances; or the formed material may be carried off as fast as it is formed, in which case the cell may remain without change in size, or it may even become smaller, although it absorbs a great quantity of nutrient pabulum. This is just the difference between the growth of tissue and those examples of secretion where the entire cell is not destroyed, and thus resolved into the products of secretion. The *formed material* of a cell may become oxidized or otherwise disintegrated and converted into *products of secretion*, at the same rate, and in the same proportion, as the germinal matter is converted into new *formed material*, to replace that which is removed, and the latter process may be exactly compensated by the formation of new germinal matter from newly-absorbed pabulum.

Growth of Tissue.

"Pabulum becomes germinal matter, while germinal matter is converted into new formed material, which is added to that which already exists, and, unless condensation, drying and shrinking occur, to compensate for the addition—increase of bulk and growth of tissue must take place.

Secretion.

"Pabulum becomes germinal matter, while germinal matter becomes converted into new formed material. The quantity of old formed material converted into the products of secretion is exactly compensated for by the conversion of pabulum into germinal matter, and germinal matter already existing, into formed material. Hence much pabulum may be absorbed, much secretion may be produced and carried away, although the cell does not alter in size. No *growth* is manifested.

"From the foregoing observations it will be noticed that I endeavor to make a sharp and definite distinction between the phenomena occurring in the *germinal matter* of the cell and those which take place in the *formed material*. I consider the formed material as resulting from the *death* of the germinal matter, and by the word death I mean that the matter cannot produce matter like itself; it has no inherent power of movement, nor any of those wonderful properties or powers possessed by matter when in the living or germinal state. I am aware that in con-

sidering tissue as dead matter I shall be met by many objections; but as the results of my observations compel me to accept this view, I will venture to offer a few remarks upon the general bearings of the question.

"In an old epithelial cell of the mouth the outer part is invaded by fungi, and is therefore certainly *dead*, for the fungi are living at its expense. Living matter lives upon dead, never upon living, matter. If my observations are correct, the formed material of the epithelial cell corresponds to, or is homologous with, that of cartilage or fibrous tissue. If, then, the first is dead, I must admit the last to be so. Or, take the case of a living, growing seaweed, the outer part of which forms the nidus for other living structures. The matter upon which these are growing must be dead, and yet this dead matter gradually passes into the more recently formed material, which was but a short time previously germinal matter. It would be indeed difficult to advance reasons for considering the old layers of the formed material to be dead and the young layers alive, while there is, as has been already shown, the widest difference between germinal matter and formed material. Surely, if anything is dead, the cortical cells of the free end of a hair or those at the extremity of a nail are dead. Nor are they less *dead* while they remain attached to the body than when removed from it; for if it be maintained that textures merely *attached* to a living body are for this reason *living*, while those detached are *dead*, the words *dead* and *living* no longer denote essentially distinct conditions or states of existence. If the matrix of cartilage or fibrous tissue be dead, the contractile material of muscle and the nerve fibre, which are homologous with it, must be equally dead.

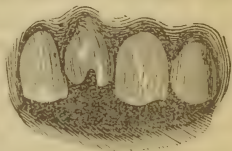
"To such an inference as this, no doubt, many physiologists will demur. My friend Dr. Carpenter, to whom my thanks are specially due for giving an excellent summary of my views, and for many interesting remarks of his own upon them, dissents from me in this particular. In his new edition of his well-known 'Manual of Physiology,' just published, he makes the following observations: 'In adopting to this extent the views of Professor Beale, the author cannot go the length with him of asserting that all "formed material" has lost its vitality; since it does not follow that in losing its power of self-increase it has thereby lost the other attributes which distinguish it as a living structure. Nothing, for example, can more characteristically exhibit vital properties, as distinguished from any that can be ascribed to its physical or chemical nature, than *muscular fibre*; yet this belongs to the category of formed material.'"*—(Med. Times and Gaz.)*

Malformed Teeth from Hereditary Syphilis.—"The following case of disease of the liver and ascites in connection with inherited syphilis, under the care of MR. HUTCHINSON in the Metropolitan Free Hospital, is one of especial interest as regards the visceral lesions which are now well known to be not infrequent in the later stages of constitutional syphilis. The case also shows in a remarkable manner the value of the malformations of the teeth as a sign of inherited taint. The malformation differed from what is usual in that it was not symmetrical. Only one tooth was affected; but it fortunately was quite typical. The condition of this tooth was the single symptom which led to a correct conjecture as to the nature of the disease. Mr. Hutchinson stated that to

* Manual of Physiology, including Physiological Anatomy. By William B. Carpenter, M.D., F.R.S. Fourth edition. 1865.

any one inclined to be incredulous as to the correctness of the diagnosis, he should cite four mutually corroborative facts—first, the very peculiar tooth; second, the history of keratitis in childhood; third, the existence of liver disease, (both keratitis and liver disease being well known to be often syphilitic;) and fourth, the beneficial effects of specific treatment. To these might be added the pale, earthy complexion of the patient. The following are the notes of the case. We may add that the patient herself was brought before a meeting of the Hunterian Society, on which occasion Mr. Hutchinson mentioned two other cases which had come under his notice in which hepatic disease and ascites occurred in connection with inherited syphilis:—

“Mrs. H., aged thirty-four, was admitted about three months ago, and is still in the hospital. She is the oldest born of her family, has two sisters and four brothers living. The next to her is four years younger. Mrs. H. was sent up from Sheerness by Mr. E. Swales on account of ascites, which had lasted for three years. Paracentesis had been performed thirteen times. At one time she suffered much from œdema of her legs—so much so that punctures were made in them. This was in June, 1863. During the last twelve months she has been tapped eight times. When first the dropsical symptoms commenced she was very ill, and was for some time confined to bed. The ascites commenced three months before the legs began to swell. During the last three months she had required paracentesis with increasing frequency, and her general health had much failed. Her aspect on admission was pale and sallow, but not jaundiced. Her physiognomy was not peculiar, if we except a somewhat earthy pallor of face. Her left upper central incisor displayed, however, the most characteristic notch. Her other teeth were normal in shape. The abdomen was distended to an extreme degree, and both legs were somewhat œdematous.



“After she had been in the hospital about three weeks, Mr. Hutchinson performed paracentesis, and drew off two pails full of yellow fluid. When the abdomen was emptied, the edge of the liver could be easily felt. It was rounded, very firm, and presenting large nodular irregularities. The whole organ was evidently much contracted. She recovered well after the paracentesis, and she afterward continued the steady administration of the iodide of potassium. Under this she has greatly improved in health, and no further operation has been needed. Mrs. H. states that she has always had delicate health, and that in childhood she was considered to suffer from her liver. Eight years ago she had an attack of jaundice, and was for a time very ill. She had a second slight attack of jaundice after the second tapping. She recollects that at the age of nine or ten she had inflammation of both eyes, which lasted for some months, and was so severe that for a few weeks she was quite blind. The cornea do not now show any superficial scars; but there is a very slight degree of haze as if from interstitial keratitis. Her urine is not albuminous, and there is no evidence of cardiac mischief. She does not appear to have ever suffered from periostitis nor from any form of skin disease.”—(*Ibid.*)

“*Hereditary Syphilis.*—DR. WILLIAMS asked the attention of the Society to a boy of twelve years affected with the peculiar form of interstitial inflammation of the cornea, which is a consequence of inherited

syphilis. The notched edge of the incisors, and dwarfed, peg-shaped aspect of the molars, with the broad and sunken bridge of the nose, thick lips, and sallow and pitted skin, so well described by Mr. Hutchinson, of London, as constituting the peculiar physiognomy of congenital syphilitic affection, as observed after the period of second dentition, were well marked in this case. The treatment had consisted in the use of hydrarg. c. cretâ, combined with tonics, under which the opacity of the cornea was diminishing and vision improved."—(*Ext. from records of Boston Soc. for Med. Improvement, Boston Med. and Surg. Jour.*)

"*Excision of the Lower Jaw.* (Under the care of MR. J. W. HULKE, Middlesex Hospital.) —, aged 29, a short, thin blonde, was admitted into Regent Ward, June 30, 1864, with a tumor of the lower jaw.

"She related that eight years previously she began to be troubled by a soreness behind the second molar, which she attributed to the last molar that at that time had not cut the gum. Four years later the gum swelled; and a year later, as the swelling increased, the second premolar, the first molar, which was carious, and the second, were pulled out, some persistent source of irritation being suspected at their roots. They were all firmly fixed. The growth was not checked by this, and the jaw became less movable, so that she could not take solid food. In June, 1863, the third molar fell out; it was carious. The following Christmas the gum was deeply lanced; no pus escaped at the time, but soon after a fetid, ichorous discharge commenced.

"At the time of her admission she was extremely emaciated and feeble, and had a very sallow complexion. The right half of the jaw from the neck to the canine tooth was involved in a large, subglobular tumor, which distended the cheek, and reached upward upon the zygoma, and backward behind the lobe of the ear. It projected to a less extent into the mouth, thrusting the tongue toward the opposite side. The buccal surface of the mass was smooth and regular, except behind the canine tooth, where there was a small, bright florid button, with constricted base. The alveolar line was not greatly distorted. An extremely offensive, glairy brown ichor oozed copiously from an opening in the tumor into the mouth. The mobility of the jaw was very limited, but it was sufficient to make it very probable that the tempero-maxillary joint was not invaded, and that the restraint proceeded from the impaction of the tumor in zygomatic fossa. Neither the skin nor the mucous membrane were structurally involved. The consistence of the mass varied in different parts; near the zygoma it had a bony firmness, while at the angle and along the lower border it was very elastic. Before the tumor appeared she was a stout, healthy woman, and she believed that none of her relations had had cancerous or other tumors. The growth had been by some persons (who were influenced chiefly by the patient's cachectic appearance) considered a cancer; but the absence of infiltration of the skin and buccal mucous membrane, and the freedom of the lymphatic glands at this advanced period—eight years after the first symptoms were noticed—were strongly against the correctness of this opinion.

"Regarding it as a fibro-cystic tumor, Mr. Hulke next day disarticulated the left half of the jaw. Bleeding from the proximal end of the facial artery was prevented by compressing the vessel against the lower border of the tumor, and tying it and the enlarged transverse facial artery at once; its distal end bled slightly at the close of the operation, and required to be tied. The inferior dental artery bled very freely. While

wrenching down the jaw in order to expose the attachments of the pterygoid and temporal muscles, it broke into several pieces, and in dissecting these out the internal maxillary artery was cut, but it was secured without trouble.

"The greater part of the incision in the face healed immediately. During the first week she took milk and strong beef-tea freely, and ℥viii of brandy per diem. After this she began to take solid food. She quickly acquired flesh and strength, and lost her cachectic look.

"August 9 she was made an out-patient, but the final closure of the wound was delayed for several weeks by superficial necrosis of the cut surface of the mandible. She continues at this date in perfect health."—(*Med. Times and Gaz.*)

"*Necrosis of a portion of the Superior Maxillary Bone.* Surgical Clinic of PROF. S. D. GROSS, Jefferson Medical College. (*Reported by Dr. John P. Shrawder.*)—M. E., 6 years of age, has a swelled cheek on the left side, occasioned by the presence of a detached portion of the superior maxillary bone in a state of necrosis. Her breath is offensive from the fetid discharge from the dead bone. The affection commenced about three months ago, after the extraction of a tooth, the child laboring under the effects of a diarrhœa at the time. Such a disease is occasionally brought on by the inordinate use of mercury, or as a result of excessive anæmia, sometimes it occurs as an epidemic, as in *cancerum oris*. The sequestrum was removed by means of the forceps, and gargles of permanganate of potash or Labarraque's solution were ordered to be used. In the course of a short time nature will restore the parts to a healthy condition. The child returned a week after the operation, free from fetor, and in all respects greatly improved."—(*Med. and Surg. Reporter.*)

Antiseptic Properties of Iodine.—"DR. RICHARDSON, an English chemist, says that iodine, placed in a small box, with a perforated lid, destroys organic poison in rooms. During the continuance of an epidemic small-pox in London he saw the method used with benefit."—(*Am. Drug. Circ.*)

Suppuration prevented by Iodine.—"The *Brit. Med. Jour.* states that at the meeting of the Academy of Sciences, on November 28, M. VELPEAU communicated a note from M. PÉTREQUIN, in which that surgeon advocated the application of tincture of iodine as a means of preventing suppuration after the removal of tumors; especially in situations such as the face and neck, where it is desirable to prevent the formation of cicatrices. Hitherto, M. Pétrequin observed, iodine has been applied with the view of modifying the suppurative process; but M. Pétrequin's object has been to prevent it altogether. He has, like M. Velpeau, many times observed that, in hydrocele, for instance, suppuration was less likely to follow the injection of tincture of iodine than of wine. He has never seen suppuration follow the injection of iodine into the parenchyma of organs, into glands, into the thyroid body, or into cavities; but, on the contrary, the formation of pus appears always to have been prevented."—(*Med. and Surg. Rept.*)

Caustic Treatment of Cancer.—"The cases decidedly unfit for caustics are those of acute or rapidly growing cancer, or those of large size, and those where there is an œdematous, brawny, or tuberculated or ulcerated condition of the surrounding skin, and those where the supra-clavicular

or axillary glands are enlarged and indurated. And most of the conditions which on general grounds forbid the use of the knife also forbid the use of caustic.

"Supposing it to be decided to destroy a cancerous tumor by caustic, all the evidence before us goes to prove the chloride of zinc to be the most effectual and safest yet employed; that it is a matter of great indifference whether it is employed as a paste or in solution; but that its action is considerably hastened by scoring through the slough, as Justamond did, down to the living tissues beneath, so that they are not protected by the slough from the action of the caustic. This scoring is not so necessary when the chloride is used in solution as when it is used as paste, after destroying the skin by nitric acid; and it is not at all necessary if one or more pairs of galvanic plates are used as the caustic. If a piece of zinc be placed on any raw surface, and a piece of silver near it, a silver wire connecting the two, the part covered by the zinc is destroyed very rapidly, and the slough formed is a very soft one, which is easily sponged away. I saw a lady, in 1854, with Dr. Lawrence, of Connaught Square, suffering from cancer of the breast, and we decided, on consultation, to adopt this method, which Dr. Lawrence carried out most effectually.

"Occasionally it is advisable to apply the actual cautery instead of using caustic, and I have recently found the use of a small jet of lighted gas, by means of the instrument made by Mathieu for M. Nélaton, very efficacious. It is much more easily arranged than the galvanic cautery, is equally manageable, and has the great advantage of destroying parts without touching them; so that there is no fear of the eschar adhering to the metal, being removed as the metal is withdrawn, and bleeding thus being set up. In cancer of the upper jaw, or base of the skull, which project into the mouth, very great temporary relief is gained, even if only a partial destruction of the growth can be effected.

"When removal cannot be recommended, either by the knife or by caustics, it must be remembered that we can do a great deal more toward arresting, even curing cancer, than is generally believed—that our art is not nearly so powerless as charlatans assert. Growths, with all the characters of cancer, have occasionally, although very rarely, disappeared under the influence of remedies. Other such growths have remained completely dormant for many years, without affecting the health or shortening the life of the individual; and it is absurd to say that the disease was not cancerous in such cases because the patient recovered, or lived to old age unaffected by the local condition."—(L. SPENCER WELLS, *Med. Times and Gaz.*)

Electrical Anæsthesia, etc.—"DR. RODOLFI has just held the second of what he terms his 'electro-therapeutical sittings,' in the Brescia Hospital, at which the anæsthetic power of the electrical current was again demonstrated before a numerous assembly, together with other phenomena. Among the latter was the production of a peculiar sound by the passage of the electrical current through the muscles. Four women, suffering from nervous affections, were experimented upon, it being first ascertained that as regards the intellect, sensibility, and motility, they were in a normal condition. 1. A woman, æt. 24, who had suffered from epileptic attacks for some years, submitted to De La Rive's electrical current for two minutes, manifested complete anæsthesia with slight 'sub-delirium.' The application having been continued for five minutes, the usual phenomena of epilepsy were induced. 2. On the other hand, another woman, who was seized with an epileptic attack in the presence of the assemblage, was

at once submitted to the current. After this had been in operation during five minutes, the attack was completely suspended, the anæsthesia of the hands and forearm being obvious to all present. 3. In this woman, the subject of 'a hysterical form of bronchitis,' Dr. Rodolfi called the attention of his visitors to the special sound produced by the passage of the current through the muscles, and observed that, after long searching for a galvanometer suitable for measuring the intensity of the anæsthesia, and the force necessary for its production, he had found that patients themselves constituted the most exact of all galvanometers. The machine must be so regulated that the sound is produced, this diminishing or disappearing also in proportion as the anæsthesia is induced. It having been previously ascertained that no noise was audible in the arm of the patient prior to the introduction of the current, such noise was after this plainly heard in the flexors and extensors by those present. It was a continuous sound, resembling a distant approaching railway train, or a roaring, and it diminished progressively with the appearance of the anæsthesia; so that after the current had continued for five minutes, and anæsthesia had become complete in the hands, the sound could only be heard in an intermittent manner along the arm, having completely ceased in the parts which had become anæsthetic. In the course of a quarter of an hour the anæsthesia had extended to the elbow. 4. In another woman, suffering from cephalalgia dependent on amenorrhœa, the sound heard immediately after the establishment of the current, disappeared in one arm and diminished in the other after the production of anæsthesia. The assembled *savants* determined that this sound should be termed the 'electrical muscular sound.'"—(*Ibid.*)

"*Management of Light in Microscopic Investigation.*—MR. J. B. DANCER lately read before the Manchester Literary and Philosophical Society a paper on a contrivance for regulating the amount of light transmitted from the source of illumination to the mirror of the microscope. When viewing certain objects by transmitted light, and particularly with oblique illumination, a very slight alteration in the quantity and direction of the light produced a marked difference in the appearance of the object, especially in Diatomaceæ, where a proper management of the light showed lines or markings invisible under ordinary direct illumination. The apparatus exhibited was easily made at a trifling cost; it consisted of a circular disk of blackened tin or cardboard, ten or twelve inches in diameter, with a number of perforations of various shapes and sizes—circular, cross-shaped, wedge shaped, etc.,—the centres of which were about three inches and a half from the centre on which the disk, placed perpendicularly, rotates. The form of perforations found generally most useful were parallel slits—slits at right angles to each other—wedge-shaped and circular openings. The object under view must be well illuminated in the direction required, and then the disk, supported by a pillar, was placed between the source of light and the concave mirror, when a few trials would determine the best form of aperture. The markings of *Pleurosigma fasciola angulatum*, etc. might be seen by its aid under powers which would not show them with any arrangement of achromatic condensers, and it also had the good property of shading all but the amount of light required from the lower portion of the microscopic stage and stand. The disk might be attached to the lamp, but it appeared to work better on a stand, and was susceptible of various modifications."—(*British Med. Journal.*)

Magnesium and Hare's Light in Surgery.—"M. FOURNIÉ, the other day, exhibited to a large class a polypus of the larynx with the laryngoscope and the magnesium light. By the aid of a Plassy lamp he projected the luminous rays upon the mirror placed at the bottom of the throat. The image of the parts reflected upon the mirror being very small, he placed a biconvex lens in front of the mouth, and so enlarged it that it was distinguishable at the distance of several yards. M. Fauvel has for some months employed Drummond's* lime light for the purpose of producing a brilliant flame in his laryngoscopic clinique. He prefers it to the magnesium light, as it is not liable to the interruptions incident to that, while it costs only fifteen pence per hour instead of a shilling per minute. M. Fauvel recently removed, by aid of the Drummond's light, a polypus from the chordæ vocales."—(*Gaz. des Hôp. and Med. Times and Gaz.*)

"Flow of Ice and other Solids under Great Pressure.—M. TRESCA made a second communication to the Academy of Sciences of Paris at a recent sitting, on this very interesting subject. He uses a strong cylinder, almost six inches in diameter, and having at its lower end an aperture about two inches in diameter. The more nearly the diameter of the opening approaches that of the cylinder in size, the less the pressure which will be required. To render perceptible the modifications which the bounding surfaces of the different portions of the ice would undergo during their passage through the cylinder and aperture, portions of it were either colored throughout their masses, or on those faces which constituted the joints. It was found that the ice comported itself in exactly the same way as lead and ceramic pastes had done in the previous experiments, which we have already described. But while a pressure of about 1792 lbs. per square inch, or that of a column of water about 4000 feet high, was sufficient to cause the flowing of the ice, lead had for the same purpose required a pressure of about 9000 lbs., or that of a column of water nearly 20,000 feet high. The effects produced were very remarkable. The surfaces of the joints, originally plain, were changed into concentric tubes, and the ice as it issued from the aperture in the cylinder was furrowed by transverse fissures, so as to resemble a series of disks rather than a continuous solid. This peculiarity had been observed also with the less flexible porcelain pastes. It was apparently dependent on the nature of the material used, and was evidently a secondary phenomenon, which took place after the flowing had happened, and while the ice was actually within the aperture of the cylinder, being due to the cessation of pressure. Each disk consisted of many concentric layers, which must have been produced before the separation into disks occurred. These experiments were believed to throw considerable light on the theory of the movement of glaciers. Superimposed layers were displaced, surfaces were distorted, layers were curved at the extremities of the partial tubes, fissures were produced when pressure ceased, etc., just as in the case of the glaciers. It was remarked that although the ice lost its original form, it did not lose its transparency under the influence of pressure."—(*Intellectual Observer.*)

"Mode of rendering Wood Plastic.—A new and very simple method of effecting this has been lately discovered. It consists in forcing dilute hydrochloric acid through the cells of the wood, at a pressure of about

* More properly Hare's.—Z.

two atmospheres. This impregnation must be continued for a length of time dependent on the nature of the wood. The bark is not previously removed, and by a very simple arrangement the fluid is introduced at one end of the log, and passes out at the other. If while the wood is still wet it is exposed to pressure, the cells having been first washed out with water, its volume may be reduced to a tenth of what it was originally; the fibres being brought into the closest contact, without being fractured or torn; and when dry they have no tendency to separate again. If it is pressed in dies, their details are brought out with the greatest sharpness, and the most perfect accuracy. Impregnation in this way can be used for a variety of purposes. After the action of the hydrochloric acid, washing out with water, and drying, the wood may be cut with remarkable facility, and it answers admirably for the purposes of the carver. The drying is effected by forcing air, at a temperature of about 100° Fahr., through the cells. The moisture is thus carried off with great rapidity; and, as the contraction is uniform through the whole mass, no cracks are produced. Dyes also may be introduced in the same manner into the entire substance of the wood, or matters calculated to preserve it from decay. Soluble glass, or recently precipitated silex, renders it both very durable and thoroughly incombustible.”—(*Ibid.*)

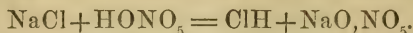
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“Fictile Ivory.—Fictile ivory is plaster of Paris which has been made to absorb, after drying, melted spermaceti, by capillary action, or it may be prepared according to Mr. Franchi’s process as follows: Plaster and coloring matter are employed in the proportions of a pound of superfine plaster of Paris to half an ounce of Italian yellow ochre. They are intimately mixed by passing them through a fine sieve, and a plaster cast is made in the usual way. It is first allowed to dry in the open air, and is then carefully heated in an oven; the plaster cast, when thoroughly dry, is soaked for a quarter of an hour in a bath containing equal parts of white wax, spermaceti, and stearine, heated just a little beyond the melting point. The cast on removal is set on edge, that the superfluous composition may drain off, and before it cools, the surface is brushed with a brush like that known by house painters as a sash tool, to remove any wax which may have settled in the crevices; and finally when the plaster is quite cold, its surface is polished by rubbing it with a tuft of cotton wool.”—(*Scientific American.*)

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“Cheap Solvent for Gold.—It is well known that there is no single acid which will dissolve gold, but that this metal is readily soluble in a mixture in the proper proportions of nitric and muriatic acids. This mixture has long been known as *aqua regia*, royal water. It is composed of 1 part nitric acid of 32° Beaume = 1.28 specific gravity, and 4 parts hydrochloric acid of 22° Beaume = 1.178 specific gravity.

“As the idea has been advanced of employing this liquid for extracting gold from quartz in place of the usual process of amalgamating with mercury, Professor Seely, without indorsing the plan, suggests that if any miners or mining companies wish to try it, *aqua regia* might be more cheaply prepared by using certain salts, containing one of the acids, than by employing both of the acids in their pure form.

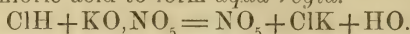
“One of these plans is to mix together a solution of salt—chloride of sodium—in water and nitric acid. Under the action of the nitric acid both the salt and the water are decomposed; the sodium of the salt combines with the oxygen of the water, forming soda, and setting free the

hydrogen, which combines with the chlorine of the salt forming hydrochloric acid.

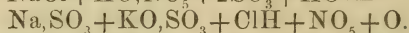
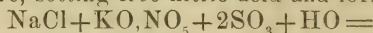


"Thus we have hydrochloric acid, and the nitric acid must be in proper proportion to form with it *aqua regia*.

"Another plan is to mix together saltpetre, nitrate of potash, and hydrochloric acid. A portion of the hydrochloric acid operates to decompose the saltpetre, setting free its nitric acid, which mingles with the remaining hydrochloric acid to form *aqua regia*.



"Still a third method is to mix together salt, saltpetre, and sulphuric acid, water also being present. The sulphuric acid decomposes both the salt and the saltpetre, setting free nitric acid and forming hydrochloric.



"Gold may be precipitated from a solution in *aqua regia* by sulphate of iron."—(*Ibid.*)

"*Metals—Solid and Melted.*—DR. ROWELL gave an account to the Polytechnic Association of the American Institute, of some experiments which he had made to test the relative specific gravity of solid and molten lead. He took a hydrometer tube, which is a glass tube with two bulbs blown in it, a small one at the bottom and a larger one above, and introducing a small quantity of lead, he melted the metal with an alcohol lamp. The quantity of lead was sufficient to fill the lower bulb and half the upper bulb. Dr. Rowell supposed that if the metal shrank in hardening it would draw the two bulbs together, and break the glass at the neck, while if it expanded it would burst the lower bulb. The glass was not broken; he, therefore, concluded that lead, in hardening, neither expands nor contracts, at all events, not more than glass.

"Another experiment resulted in the same conclusion. Having a kettle with a hemispherical bottom, he filled it with molten lead and allowed it to cool. He then melted it all except a little lump at the centre of the surface, and observed that the upper part of this lump was precisely at the level of the surface of the molten mass. But if the temperature of the molten lead be raised a few degrees above the melting point, the solid lump sinks; lead, whether molten or solid, being subject to the law of expansion like other bodies.

"The case is different with iron. Visiting an iron foundry a few days before, he took the opportunity to drop a small ball of nearly red-hot cast-iron into a ladle of the molten metal, and the ball floated, with about one-tenth of its mass above the surface. One of the workmen dropped a leaden bullet into the ladle, when it went to the bottom instantly.

"Mr. Blanchard said that he had tried the experiment of throwing solid cast-iron into molten cast-iron a thousand times, and it will always float.

"Mr Norman Wiard observed that there was some deception practiced in relation to the leaden bullet; as every foundryman knows that if lead be mixed with molten cast-iron an explosion follows. The iron may all be thrown out of a ladle at any time by placing a little lead in the bottom of the ladle before the iron is drawn in.

"Mr. Bird said that in melting lead he had tried the experiment many times of pushing, with a stick, a solid lump of lead to the bottom of the molten mass, and it would invariably rise again to the surface.

"The Chairman explained that he was present at the experiments made by Professor Everett, an account of which was given at the time, and it was found that a pig of solid lead would sink in a kettle of molten lead, but whether the temperature of the molten lead was not considerably above the melting point, was not carefully observed. Had the solid and the molten lead been of about the same temperature perhaps the result would have been different.

"Mr. Garvey remarked that the fact of the solid floating upon the molten metal was not conclusive proof of a lower specific gravity, as there were mysteries connected with the behavior of the substances under these conditions that had not yet been unraveled.

"Dr. Parmelee observed that water, sulphur, and some other substances when they change from the solid to the liquid state, crystallize, and the crystals arrange themselves in such way as to have interstices between them, in this way diminishing the specific gravity of the substances. But substances which have not this property, increase their specific gravity in passing from the solid to the liquid state. If the experiment be properly and fairly tried, it will be found that solid lead or iron will always sink in the same metal melted."—(*Ibid.*)

Alloys of Manganese harder than Steel.—"DR. O. E. PRIEGER, of Bonne, in Rhenish Prussia, has for some little time past been practicing on a great scale a cheap and simple method of producing alloys of manganese and iron, and manganese and copper, containing considerable proportions of manganese. Alloys of manganese and iron he calls 'ferro-manganese,' and alloys of manganese and copper, 'cupro-manganese.' To produce ferro-manganese he mixes oxide of manganese, in powder, with powdered charcoal and malleable iron, the latter being either granulated or pulverized cast-iron, or else either malleable iron or steel in the form of filings, turnings, borings, or the like. The quantity of charcoal in the mixture should be equivalent to the quantity of oxygen in the oxide of manganese, and the quantity of iron in accordance with the proportion of that metal required in the particular alloy it is desired to produce. The triple mixture is placed in crucibles, preferably of graphite, holding from thirty to forty pounds each, and covered with a layer of carbon, fluoride of calcium, common salt, or any other substance capable of preserving the mixture, when heated, from the action of the air. The crucibles are then exposed for several hours to a white heat, and on their being cooled there is found at the bottom of them a homogeneous alloy of manganese and iron. Were a mixture simply of oxide of manganese and carbon similarly treated, the oxide would be reduced by the carbon, just as when iron is present, but the liberated particles of metallic manganese would not fuse together into one mass. Some of them would combine with the silicon of whatever silicious matter, if any, were contained in the mixture, and the others, combined with more or less carbon, would be found, on cooling the crucible in which the mixture had been heated, in the form of exceedingly fine powder, and on exposure to the air would very rapidly be reconverted into oxide. When, however, metallic iron is present in a mixture of carbon and oxide of manganese exposed to a heat at which the latter can be reduced by the former, the iron seizes the particles of metallic manganese as they are set free, and prevents them from combining with more than a trace of carbon, or with more than a very minute quantity of silicon, if that body be present, and at an alloy of iron and manganese containing scarcely any appreciable admixture of

any foreign substance collects in one mass, of uniform composition throughout. By this means, alloys of manganese and iron, containing almost any desired proportion of manganese, may be produced with ease. The particular alloys of these metals which Dr. Prieger considers most likely to be of use in the arts are two which contain their constituents in atomic proportions, one of them consisting of two atoms of manganese and one of iron, and the other of four atoms of manganese and one of iron. The proportions of manganese contained in these alloys are 66.3 and 79.7 per cent. respectively. Both these alloys are harder than the hardest steel, and take an exquisite polish, their color being between that of steel and silver. They fuse at a red heat, and are well adapted for casting. Exposure to the atmosphere does not in the least oxidize them, and even exposure to water oxidizes them only at the surface. In this non-liability to oxidize they differ remarkably from unalloyed manganese, which is oxidized by exposure to air but little less readily than potassium and sodium, and which decomposes water with great rapidity, at all temperatures—combining with its oxygen and setting its hydrogen free.

“The method of producing cupro-manganese differs from that of producing ferro-manganese only in metallic copper, instead of metallic iron, being added to the mixture of oxide of manganese and carbon. If, instead of copper, an alloy of copper and some other metal be used, an alloy of cupro-manganese with that metal will be obtained. The varieties of cupro-manganese resemble those of bronze, but are much harder and more tenacious. The alloys of cupro-manganese with zinc are readily fusible, possess great tenacity, work very easily, and are of a color and lustre approaching those of fine silver. These and other alloys of cupro-manganese, and also the varieties of cupro-manganese itself, promise to be very useful for artistic purposes. As regards ferro-manganese, what Dr. Prieger seems to value it most highly for is the ready means which it affords of adding definite quantities of manganese to ordinary iron and steel. He makes some very remarkable statements respecting the advantages which he has found to result from the addition to these metals of proportions of ferro-manganese varying from one-tenth per cent. to five per cent. Should these statements be borne out by the experience of others, ferro-manganese will come largely into demand for the purpose indicated. In any case, uses of some kind are certain to be found for it. Meanwhile, we may congratulate Dr. Prieger on having virtually introduced a new metal into commerce—for metallic manganese has hitherto been obtained only in exceedingly minute quantities, at a cost exceeding that of gold, whereas Dr. Prieger has already produced some hundreds of tons of an alloy containing eighty per cent. of it at a cost of not more than about nine pence a pound.”—(*Ibid.*)

Turpentine in the Rolling of Metals.—In a notice of the manufacture of cheap jewelry, (*Ibid.*,) it is stated that the proprietor of the establishment, in Providence, employs turpentine to facilitate the operation of rolling metals down to the requisite thinness, and illustrates its value therefor by the following experiment:—

“MR. STEERE took a nickel cent from his pocket and presented it to the rollers, but they refused to draw it till he dipped the edge in spirits of turpentine, thus increasing the friction, when it was instantly drawn through.”

It is probable that petroleum, glycerin, and other hydrocarbonaceous substances will answer the same purpose.

THE
DENTAL COSMOS.
NEW SERIES.

VOL. VI.

PHILADELPHIA, JULY, 1865.

No. 12.

ORIGINAL COMMUNICATIONS.

—
PRACTICAL HINTS.

BY J. D. WHITE.

Filing Teeth.—This is a part of the dentist's duty which may be very much abused if great care and forethought are not exercised. Independently of the immediate results of the operation, he must think well of the future as to what position the teeth may assume when the lateral support of the teeth is lost by filing away parts that touched. No one can tell in what direction precisely they will settle; and this cannot be too much regarded in the lower teeth, or any case where it is desirable to arrest decay by the use of the file.

It is a fact that the lower teeth can be preserved by the use of the file better than any others in the mouth; at least that is the conviction of the writer; and enough attention is not paid to this fact. It is owing, perhaps, to the fact that the difference between these teeth, and others in the mouth, has not been observed. Very frequently dentists will plug these teeth when they have very small cavities; the teeth settle together, and decay soon supervenes, and the plugs are lost, and refilling is required.

Twenty-five years ago a distinguished medical gentleman sent his son, of twelve years of age, to us to get his teeth cleansed, especially his lower teeth, as they looked so badly. We found, on inspecting the teeth, that the enamels were defective, the teeth were full of pits; this we believed to have resulted from defective formation of the enamel while the teeth were forming. Where there was no enamel, the teeth were discolored, owing partly to the want of enamel and the deposit of sediment in the pits, but between the teeth there was slight decay. We knew we could not cause the teeth to look much better, and we sent the boy home, requesting him to tell his father to call to see us with him as soon as he could, so that we might explain the condition of his teeth and why we could not make them look much better by cleansing.

He called the next day, and we explained to him that the unsightly appearance of the teeth was due to the defective deposit of enamel, and that nothing could be done but brush out the pits on the front parts of the teeth and file out the cavities between as much as possible, so that the teeth would not quite touch, and in that way they would be kept clean by chewing, and the saliva would flow between them and prevent decay. We might add here that the doctor inquired of us what was the cause of the defect of the enamel. We said that, in all probability, the boy had been very ill when quite young, and the nutritive functions much interfered with, and that the defect of the enamel was due to that cause. He answered at once, that the boy had never been sick in his life. We said if that were true, it was the first fact to disprove the principle we had ever met, and we would make note of it, as we had always traced this condition to severe illness or a habitually bad constitution. He told us to do as we pleased with the teeth, and left us. We filed the teeth apart at two or three sittings, a few weeks between each sitting; the teeth are good up to this time. In a few days the doctor called to tell us that the record must be corrected, that the boy had been very ill when a child, during his absence for a long time, and he had forgotten it.

About five years since a boy of nine years of age was brought to us to get advice about his teeth. He was an only child, and much solicitude was felt by his parents about his teeth. The family dentist told them that the teeth were naturally bad, and nothing could be done but let them last as long as possible, and when he grew up to extract them and depend on artificial ones. We found the enamel very defective, but much more in the upper than the lower teeth. Many of the pits of the upper teeth have been plugged, and the teeth preserved. All of the lower teeth commenced decaying between, and the sides of the canines next to the lateral incisors. We filed them apart with a very thin file and let them go one month, at which time we examined them to see how the teeth had settled. Some spaces were wider than others; the file was again passed through between the teeth where they were closest together, and left go on another month, when the same process was followed. In this way we finally obtained the same distance between each tooth, so that the spaces are as regular as the spaces between the teeth of a comb. If we had filed a wide space at once, the teeth may not have all settled alike, and the spaces would have been unequal without cutting too much off some of the teeth. The same thing applies to some extent to the rest of the teeth in the mouth also. We might add here that we never file to obtain *space* for the purpose of plugging, as we see, by recent discussions, some are still in the habit of doing. We consider the substance of the teeth too precious for such an operation. It is true it was practiced to a great extent in former times, but the preservation of the teeth sometimes demands the free use of the file, but only as a last resort. As refinement and skill

advance, and the value of tooth substances is regarded as a matter of appearance, the use of the file should be restricted. Skill in the use of the file, no matter how bad the teeth are, should be so used as not only to preserve the teeth but to cheat the observer to believe that a bad set of teeth are after all *very* good. This should be the dentist's study, and in this only can he display his real skill and the highest development of his art. *This is the end of Practical Hints.*

HYPERTROPHY.

BY WM. H. ATKINSON, M.D.

Read before the Society of Dental Surgeons of New York City, April 12, 1865.

THE great desideratum in communication of ideas consists in unmistakable vehicles of transmission. These symbols of ideas consist—first, and most abundantly, of *words*; and second, of forms of bodies and diagrams which are capable of cognition by the sense of *sight* rather than sound.

All writings are examples of the latter, in which characters and figures represent sound, and absence of, or intervals in sounds; which sounds by consentaneous acknowledgment or agreement, represent ideas whose coherence make sense, and whose non-coherence make nonsense to the mind of him who hears.

This fact in nature has made it a necessity to us to have a standard to which to conform, as to what particular, simple, or compound sounds we shall attach definiteness of idea singly or in complication of relation and numerical strength.

That *terminology* should be founded in the *nature of sounds*, and the USES to which appropriated in delineating our experiences, mental and physical, no one will deny. But so vast is the range of difference in the modes of life and being, mental and physical, which obtain among men, that without identity of education we have no means of comparison of our experiences by which to determine agreements or disagreements. That which is natural and regular to him who has long experience and breadth of range in observation, is *unnatural*, *irregular*, and *unaccountable* to him who has but entered the threshold of his career in education or in practice.

If then we would progress in knowledge and ability consequent upon better apprehension of the functions and failures of molecules and men, it behooves us to take a general survey of the history and literature of the past and present, by which to determine the use and abuse of terminology, and the truth or untruth of the doctrine founded thereon and propounded thereby!

The origin of language is involved in too much obscurity for us to

give satisfactory account of the nature and philosophy of the parts of speech; nor does it belong to the subject of this paper to detail it, further than to trace the rise and progress of our knowledge of vital acts, and the disturbances and agreements consequent upon the presence of the forces or modifications of force capable of producing and destroying them.

Anatomical, physiological, and pathological nomenclature was of slow growth, and had to be changed or modified to accommodate the discoveries in organs, function, and disease resultant upon increase of population and refinements in society. Each advance made in either of the departments specified, was hailed as the overthrow rather than the further unfoldment of the doctrines founded in the nature of structures and their nutrient activities.

The discoverer of the advance usually became the leader of a school, which became the source of much bitterness of disputation and ill feeling very unbecoming professional men.

As it was in the past so it still continues to be; discovery does not come from the legitimatists as a general rule. And hence every improvement in our knowledge and methods of teaching and putting these to practical use, has to pass the ordeal of neglect, abuse, or persecution by those who ought to be the first to hail with delight, and foster with sedulous solicitude the bantlings of progress.

As each epoch forces upon us and establishes the particular doctrines belonging to it, the progressives of the past in turn become the conservatives, to repeat upon the progressives of their own times the puerilities from which they had suffered in working their own ideas up the rugged path of general recognition.

Thus the particular dominant doctrine of the time is the touchstone to which all disputes are brought for settlement. Thus at one time all pathological manifestation was referred to derangement of the "humors;" at another of the "nerves;" and then of the "fluids," "solids"—to "gastro-enteritis"—to a "slow liver," etc. to the end of the chapter.

Have we emerged from this folly even now in the boasted advancement of what is called "correct apprehensions of the organs and functions belonging to the living animal body?"

In reply to this query, I would say that we have only reduced to more definite limit the field of vital actions. And this is principally (may I not say wholly?) owing to the microscope. By the use of this indispensable means of research in anatomy, physiology, and pathology, (may I not truthfully say chemistry also?) we are enabled to contemplate bodies and actions that were entirely beyond the domain of vision without this marvelous additional aid to our powers of perception. *

But have we done more than uncoil another turn of the chain of causation? Have we yet seen a primate or an ultimate body even by this

great help to visual acumen? Nay, it only reveals bodies to "sight," after they are formed into definite existence!

We are yet left without tangible testimony of what function really is, other than the changes it works upon those bodies that are subjects of sight.

What then is *the* great necessity to advancement into the territory of life itself? I have not the least doubt that the "sine qua non" to further progress is the acknowledgement of that modification of force that has been denominated "type," to be in fact an individual existence or body, a ghostly presence that builds and pervades all bodies, differentiating and correlating them into orders, classes, genera, species, and varieties in exact accordance with the constituency and character of this unseen cause of all the varieties of motion of which we are cognizant. That which has no motion has no life—is nonentity—nothing! Hence all things move. Now, the simplest of all movement is the vibratile. This has two modes of expression, viz., that of the pendulum, when tension fixes one of its points, producing relative stasis of the part; and open and close or diastole and systole, which is the type of and proper act of breathing.

Now breathing is nothing less than inspiring and expiring that which is capable of being taken into and thrown out of the body capable of this rôle of activity.

Just so long as the body was looked upon as a unit in its nutrition, all was vague, uncertain, and incomprehensible, the moment the subject of local disturbance of the nutrient act was broached. And when the glandular and circulatory systems were discovered and acknowledged, some advance was made toward apprehending the community of acts and organs that holds sway in corporate bodies when performing the general and special functions of nutrition.

It soon became evident that parts of organs were the subjects of derangements of the nutrient activities without involving the whole of the structure in kind, and thus led to the discovery of the fact that the secretive act took place in a much less extended territory than had been supposed. So the cell became the acknowledged unitary example of the nutritive function.

The tissues all being composed of these primates varying in character and function according to the particular structure they composed; cells became divided into vascular, nervose, and osseous; all being modifications and amplifications of simple or connective tissue cells. All tissues, it will now readily be seen, are nothing but greater or less degrees of obliteration of cells. Hence hypertrophy must take its rise in excessive nutrition of these primal bodies which contribute to the general increase of the structure which they compose.

Thus increased activity in the nutrition of cells in osseous territory

will present us with hypertrophy of bones, in muscles of muscle, in nerves of nerve, in glands of gland, etc.

The limitations of these hypertrophies will be marked by concurrent vascular and nervous supply to the territories involved.

It has been customary to only regard as hypertrophy that degree of excessive nutrition which interferes with the proper performance of function; in a word, it has been and is usually regarded as a pathological condition.

Instance excessive nutrient activity and capacity of the digestive apparatus in "bon vivants," of the muscular and osseous in gymnasts, of the brain in those who exercise that organ in proportionate excess over the other organs of the body.

It is questionable whether we should regard these examples of hypernutrition as absolutely and sensibly pathological in nature, when increase in size without deterioration of function only is manifested. But all cases of encroachment upon organs in normal size and activity, rendering them incapable of fullness and freedom of functional motion, is doubtless purely pathological in character, whether from mechanical impingement of the hypertrophied organ or from privation of the requisite and normal amount of blood sent to the part by appropriation to feed the hypertrophy.

Were we to treat fully all the hypertrophies to which the body is liable, we should far exceed the limits of a paper designed for reading in a small part of the time allotted to us in our evening exercises. It would include, in fact, a full account of all the organs, if not the tissues of the entire body, and their behavior under undue amount of stimulus. At the two extremes stand epithelioma and exostosis, between which we may range all tissual and organic hypertrophies, with perhaps the single exception of neuroma, which, in strictness of fact, ought to be placed at the extreme or beginning of all pathological activities; although when speaking as to locality it properly takes its place intermediately along with vascular and visceral hypertrophies. So little has been elaborated upon this subject, in a general way, that we will find our best instruction lays in the domain of special examples of the affection. To him whose field of labor lies within the oral cavity, three forms of hypertrophy are of interest, viz.: 1, epithelioma; 2, epulis; 3, exostosis. The first displays itself upon the tongue and mucous membrane, and is so rare that few dentists have seen more than a single example in a whole lifetime of close application to the study of and operations in and on the mouth. That which attacks the tongue occasions so little inconvenience in its early stages that it is not noticed till after making such progress as to increase the size of the organ to the degree of discomfort, or is discovered when examining the mouth for other purposes, such as diagnosis of disease or examinations of the teeth.

Epulis (from *epi*, upon, and *ulon*, the gums) is more common, and is a true hypertrophy of the gingival tissue. It has two forms that differ very much in character and treatment. They may be called simple or benign, and malignant. The former only requires perfect extirpation and toning of the general system for its radical cure. But the malignant is most stubborn under management of even the best means and practitioners. Rigid regimen and well-directed aid, medical and surgical, will, however, overcome it in most cases if persistently pursued.

Exostosis is the form of hypertrophy that far exceeds all others that come under the eye and care of the dental surgeon. It presents itself in two forms: the first and most infrequent variety is hypertrophy of the alveolar processes, sometimes called "bony epulis." It lies immediately under the gums, and so encroaches upon the gingival structures as to reduce them to little more than mucous membrane, and a little connective cellular tissue. The gums are *hard* and white, or very pale, from the sparsity of blood-vessels and thinning of the soft structures which appear stretched over the excessively thick and protruding alveolar processes, whose plates are sometimes increased in bulk and density throughout their whole extent, and at others the increase is confined to a line a little below the margins, which forms a ledgelike projection, more particularly at certain localities presently to be specified. On the upper arch this "ledge" occupies a space between the second molar and canine, sometimes filling up the zygomatic fossa and imparting a "bloated" aspect to the features in that locality, corresponding to the size of the hypertrophy. On the lower jaw it selects a site bounded by the second molar and the "symphysis-menti" on the lingual border of the jaw. I have seen a few cases of this variety, one of which was excessive and very curious. It projected a full quarter of an inch on the posterior extremity, gradually tapering to a point at the symphysis on each side. The tongue seemed supported at its inferior free border on this beautiful "table-rock," as it indeed was. It gave the patient no inconvenience. Extirpation is the means of cure for this form of hypertrophy, precisely as surgeons cure exostosis.

The second form in which exostosis presents itself to dentists is in the shape of a true hypertrophy of the cementum. This is, by far, in excess in number and frequency of cases of any other form of exostosis to which the body is liable.

The whole surgical and dental world are in a maze of misapprehension of the cause and mode of development of this simple hypertrophy of one of the indispensable structures composing the masticatory organs.

Under the head of "causes of exostosis of the teeth,"—hypertrophy of cement—are enumerated "blows," "biting off threads," "biting hard substances," and, most weak of all, "too constant grinding of the teeth together!" I take it upon me to say that none of these "causes," so

called, *can alone*, however persisted in, produce a single case of hypertrophy of the cement. That this does occur coincidently with such conditions as enumerated, I do not doubt; but that they stand in any degree in the relation of cause and effect, the most superficial knowledge of the mode of nutrition of this structure will at once negative forever.

So far from excessive use of the teeth producing this state, it will either establish and maintain perfect health of these beautiful structures, or cause their absorption. In fact, the function of the teeth should alone be the complete vindication of this position to all at a glance. But such is the gregarious nature of the mass of mind, that they would prefer to take for granted any doctrine, reputably put forth, than to taking the pains to investigate for themselves and those who come after them, to see "if these things be so."

Whenever exostosis supervenes upon "blows," it results from the non-use of the tooth or teeth which suffer from the violence. The dislocation ruptures the vascular connections through which nourishment is conveyed to the part, and from these pour out the materials from which the subsequent exostosis is formed; and this is retained in position favoring hypertrophy only because the normal conduits are unable to carry off all excess above the immediate wants of the cells proper to the part to keep them in good working order. In fact, complete dislocations are not the cause of exostosis in cases where the replaced tooth is brought into vigorous use so soon as the first tenderness is passed away, before the plasm ("exudate") has time to organize and prevent the cancellous portion of the socket from resuming its proper state and nearness to the end of the root which had been for a time displaced.

"Physiological rest" is the specious pretense for long-continued inaction to the tooth or teeth in such cases. Now *this is* the very "*sine qua non*" to recovery, without more than the merest film of exostosis. But what constitutes "physiological rest" is the question that lies at the very bottom of this point of dispute.

Now, physiology is the normal use or action of organs as parts and as a whole. Therefore, where health holds the dominion of the body, and local mischief, in the shape of partial or complete dislocation of a tooth or number of teeth takes place, all that is necessary is to replace actually and promptly the severed parts, and keep them in position by any and every adequate means, and perfect recovery of attachment will be sure to follow.

In case the soreness of the disturbed tooth or teeth be such as to be more than slightly uncomfortable, disuse in proportion to the degree of uneasiness is all that is requisite so long only as the sensibility calls attention to the part in use. After the sentiency no longer takes cognizance of the part as invalid, it should and will be used as in the former condition,—this is true "physiological rest." In a general way, the period

throughout which the disuse should be insisted upon will vary in accordance to the degrees of violence affecting the part, the particular constitution and state of health of the person, etc., but will not exceed from three to eight days in any one who can be denominated a healthy person; unless with the dislocation there be also fracture of the bed or socket of the tooth to a considerable extent.

It cannot be supposed for a moment, by any one at all acquainted with the subject, that exostosis can take place in this short space of time.

Having disposed of the exostosis of traumatic origin, we may now say a few words of two other forms of this affection, viz.: first, loss of the occluding tooth or teeth involving disuse in greater or less degree of the organs implicated; second, constitutional cachexia in which lime-salts are in excess in the circulation.

These last, as gout and rheumatism, are best treated by "exercise." So we see that, so far from disuse being the cure, and vigorous use the cause, the very reverse is the case in all these affections.

Now, in case we are able to diagnose this condition before it has advanced to the degree of intolerance in the body, all we have to do is to treat the case locally if it be the result of purely local cause, and constitutionally and locally when both causes are present. How shall we treat it locally? Ans. By simply opening into the pocket which holds the plasm around the end of the root so thoroughly as to give free vent to the dense fluid out of which exostosis (hypertrophy) results, and perfect relief immediately follows the simple proceeding.

Where excess of lime predominates in the circulation, deprive the patient of all forms of food containing lime-salts, and also give remedies which have the power of solving and fluidifying not only that already in the fluids of the body, but also that immediately beneath the periosteum. To which add the local procedure already directed.

In all cases where the antagonism of teeth is lost, and they are troublesome, the best course is to resort to artificial substitutes at once.

PROFESSIONAL EDUCATION.

BY T. L. BUCKINGHAM, D.D.S.

IN April last I published an article on the above subject, to which Jas. E. Garretson, M.D., in the May number of the DENTAL COSMOS, made a reply. He prefaces his article with a long reverie concerning his experience since he first became a member of "the old, time-honored Pennsylvania Association," "with its learned dissertations on plugging teeth,"—"the long essays on alveolar abscesses,"—"Amalgam, with its bright beginning and its black end." He says he has now "grown wiser from wider intercourse with the world," *he* "can now but often smile at

our earnestness over *little things*—not forgetting, however, the strong words and wise teachings—and wonder how a gum-boil should have commanded words of such ‘learned length and thundering sound.’ We were boys then, we are coming now apace to manhood—moving on from sphere to sphere.” I would not have broken in on this pleasant reverie, but I want to ask a little favor which may be of service to others as well as myself. As he has grown “so wondrous wise,” would it not be generous in him to write a few articles on plugging teeth, so clear that the old might profit and the young be governed by them? The amalgam subject also requires finishing up; and then the alveolar abscesses have not been so perfectly explained but there are still some even now who do not know the history of a drop of pus, from the formation of the cells to their final destruction. If the doctor will clear up all these subjects, he may acquire the reputation of the village schoolmaster, “and still the wonder grew, that one small head could carry all he knew.”

But I must pass on to the more serious part of his article. He has republished the extract I selected from the London journal, and italicised the part I referred to, but he has not copied one word of mine, nor answered a single argument I advanced.

The question was asked, “Is the standard of dental education tending downward rather than upward?” He charges me with arguing the downward side of the question; but why does he not give my reasons? Was it because he could not meet the facts I stated, or did he not want to admit what he could not contradict? He attributes the whole depressing tendency of my article to the establishment of a second dental college in this city. I grant it will bear such a construction, but I did not confine myself to these colleges, one of them having been so recently established that it would be difficult to say what effect it will ultimately have: the tendency so far has certainly not been to elevate the standard of dental education. He and his friends have held up the medical schools as examples, and I thought if I could show the effect they have had upon each other, when located near together, we might draw an inference of what was likely to follow the others. Did I not show by facts, which he has not attempted to dispute, that the oldest medical school in this country did reduce its standard, both in money and time, to conform to the regulations of a younger one? The oldest had magnificent buildings, the largest medical museum in the country, and a very large fund invested for its benefit.*

If we wanted other arguments to show that the standard has been reduced, the doctor furnishes a powerful one himself when he says, “the Philadelphia schools are at this moment having their proud prerogatives

* It has over seven thousand graduates, and its grounds and endowments are valued at three hundred thousand dollars.

shaken by the establishment of a higher order of schools in the hospital colleges of New York." Did not this same school (of which he is a graduate) strike off the hospital ticket from its requirements several years ago?

And yet, in the face of the above facts, (which I published in my previous article,) the doctor asks the question, "can my friend be so misinformed as seriously to say that such attrition has not mutually benefited the two medical colleges of this city?" Have I not shown by the statements above, which he will not attempt to deny, the effect they have had upon each other? It would be difficult now to say what would have been its condition if there had been but one established in this city, but we may draw our inference from the European schools. Have they degenerated within the last fifty years? And yet no two of them are established so close together as to produce the attrition he speaks of. Would four or five colleges of surgeons in London, each depending for its support on the number of students attending, be a benefit to each other? Would five or six rival medical schools in Paris advance the science faster? Would a medical college in every city in Germany, and in the larger cities two or three, have added more to our knowledge of medicine? The schools in these countries have not died from inanition. Even the oldest school in this city lived over fifty years without opposition, and it made as much progress during that time as it did in the last fifty.

According to his reasoning, our increased number of medical colleges should have been a benefit to each other. But to my question, "what has become of the four or five other colleges that have been established here?" he remains silent. "Surely in a city where there are nearly one thousand medical students, who pay at least one hundred thousand dollars annually for medical instruction, more than two colleges should be sustained." Some of them closed their doors honorably, while others struggled for a number of years, resorting to such means to attract students as rendered them a reproach to the name of colleges, and some others even went so far as to sell diplomas to persons who never heard a lecture in their rooms, nor underwent an examination by the faculty.

Competition in some things may do very well when not carried too far. When the demand for an article is greater than can be readily supplied by the manufacturers, an increased number of manufactories is needed, but where those who are engaged can scarcely make an honest living by putting forth all their energies, a new establishment must expect to resort to some means to get customers, either by cheapening their goods or reducing the quality.

Competition, as it is usually understood, should not be known in institutions of learning. We have all over our country schools with high-sounding names of colleges or universities that grant diplomas to persons who are scarcely prepared to enter the lowest class in a well-established college.

Would any one argue that our public schools would be better if the remuneration of the teacher depended upon the number of scholars that passed through the school, or that our high school graduates would be better qualified if the salaries of the professors depended upon the number of graduates ; or that another class of schools should be established to stimulate the present ones, by holding out inducements to scholars that they could pass through theirs easier than they could through the others ?

What I have written will apply to all institutions of learning that depend upon the students for their support. Where they are located near together, and are nearly on an equality, the one offering the greatest inducements, either in time or expenses, will compel the other to come to its standard.

There is a paragraph in the doctor's article which will bear a few comments. He says : " Let no man be so weak as to suppose he will graduate easier in Philadelphia because of two colleges ; on the contrary, the two must make it just so much harder, and of necessity make it so." Have the two medical colleges in this city made it harder to obtain a medical diploma ? Did not others here sell them without any requirement except the fees ? Have not dental students graduated in a shorter time than they ever did before—in less than two months ? If he will answer these questions, we may be able to ask him some more equally pointed. And he remarks again : " As for that, how pitiable and ignorant must be that man who sets a store by an easy graduation !" I could point him to cases that would surprise him and his friends, of students, when undergoing examination, who begged to just make it easy in *their* case ; they knew that they were deficient in some of the branches, and not any better informed in the others than they should be, but if they could only pass they would promise faithfully to study in the future and make up for what they were deficient.

Are not students now endeavoring to make conditions that they *shall* graduate ? If the doctor would examine the correspondence of a dental college he would see that the common request is to know how they can graduate in the shortest time and at the least expense.

I think I have now answered all the arguments advanced by the doctor, as well as embodied the leading points in my previous article. His beautiful flights about things " finding their level," and " attrition polishing jewels," may do very well to tell those who allow others to think for them, but if they think for themselves they must see that the level is to bring the high down as well as raise the low up. The phrase to " level up " is a political matter, and used by politicians to catch votes. The best jewels are polished by attrition ; but in localities where they are produced, false jewels are also manufactured, and the manufacturer and wearer expect, by their coming from near the genuine ones, and resembling them in many respects, to deceive the public and pass the false for genuine.

I should probably not have replied to his article if he had not charged me with writing mine in a "fit of spleen." I can assure him I did no such thing. I feel as much mortification as he does in having such an article published; but while he would endeavor to cover up the defects, I have thought it my duty to expose them. It is not those who cry "peace, peace, when there is no peace," but it is the watchman on the wall who gives the alarm, that is the faithful guardian. If what I have stated is true, the profession should know it and endeavor to find a remedy. If it is not true, it will do me more injury than it can others.

I have not published the above to influence any one for or against either college. I do not suppose that the profession at large cares one particle which succeeds or which goes down; but I think they ought, and do care, whether the standard of dental education is raising or lowering.

And now I close with the sincere hope that the doctor expresses at the close of his article, *"that no one may feel it incumbent on him to make any reply to this friendly meant article, or to further agitate the subject."*

ODONTALGIA.

BY WM. B. HURD, D.D.S.

Read before the Brooklyn Dental Association.

I REQUESTED of the committee appointed to select and assign subjects, that they would appoint me a subject easy to speak upon, one of the simple subjects of the series,—a subject that did not require deep research, or any great effort of the brain; or in other words, a subject that did not need the efforts of a massive mind to make it interesting.

The committee assigned me, as my subject, "Toothache," to which I made no objections, but was at first rather gratified. I said to myself: Toothache! Why, any one can talk upon toothache. I, at least, with my years of practice, ought to be familiar with the subject. I have seen enough of it; I have relieved enough of it. And the keenness with which I well remember its bitter pangs, will testify that I have felt enough of it.

At the last meeting of the Association, our most worthy President informed me that the time had come when the Association would expect to hear from me on the subject of toothache. I congratulated myself then, as before, with the easy task before me.

On my return home, in my moments of leisure, my mind naturally turned to the discharge of the duty expected of me. I thought of the terrible sufferings I had witnessed; of the thousands of half-frightened beings I had relieved; of the many swollen and distorted faces that had come under my hands; of the terrible groans and sighs consequent upon

extraction; of the many shattered constitutions, the result of toothache; of strong men being unmanned by the remedy; of the halting and stopping at the door; of the tremulous tread, and wild looks and glances of the suffering, as they approached the chair; of the indecision and weakness of those who were strong and decided in other matters; of the many little innocents that have gone like lambs to the slaughter, to pay the penalty of others' faults; of the many vexatious hours I have spent in coaxing, trying, or forcing turbulent half-grown boys into submission; of the frantic hand that had clasped with mine in the struggle; of the frequent trials of strength between myself and some two hundred-pound athletic gentleman; of the racking and cracking among the net bones, as the offender reluctantly yielded up its natural birthright; of the thousands of times I have stood with feathers lopped at the breaking or crushing in of some miserable shell; of the patient's look of disappointment; of the frequent words of censure; of the half-uttered, indistinct murmurings of "botch," or the indignant frown, that in its own, peculiar language, wished me certainly no better place than heaven.

I thought of the long-told tales of suffering, when each minute seemed an hour, and each hour an eternity. I thought of the thousands of valuable teeth that, in my ignorance, I have uprooted; of the many dilapidated and sunken faces that I have made; of the many substitutes that, through toothache and my ignorance, have been introduced to play the part of nature, and these terrible failures at the best.

I thought of all these things that I have enumerated, and then it occurred to me, of what interest or profit is all this to the profession? I am not to amuse or instruct a company of children, but to talk to my professional brethren; those who are daily witnessing the same that I do, who are capable of passing correct judgment upon the truth or falsity of all that I may say. It occurred to me, I am to talk to those who will scan every sentence, and in their own minds pass judgment upon the amount of calibre possessed by the speaker. Being anxious, gentlemen, to meet your expectations, I said to myself,—Shall I discuss what is toothache? Shall I speculate? Shall I, with fine-spun theories, draw your attention from the common acceptance of the term, and run off into vague speculations, and tell you that all that has been said by such men as Harris, Fox, and others, is but the surface, while I play, like the leviathan, in the still waters below? Shall I say to an exposed pulp, you are but an aching string, and not toothache, torn away from your hiding-place, and the tooth still remains without pain? Shall I say of periodontitis, you are not toothache; you are an inflamed membrane, and, if cut, your occupation ceases? while poor tooth, like poor Tray, must bear the imputation for being in bad company. Shall I say to sympathy, you are but the child of necessity; born to bear burdens that we know not where else to place,

the selected stool-pigeon, to stand out and flap your wings in the name of science, while you are but the offspring of ignorance? Shall I attempt to show my ingenuity still further, and say to sympathy, From whence art thou? and what art thou? we are anxious to know something of thee; we have accredited thee upon the statement of others, and in thy name palmed ourselves off as well indoctrinated in the mysteries of God's strange work? Art thou a relative of idiosyncrasy? art thou tangible? art thou a spirit? art thou the infinitesimal spark of electricity that one molecule sends to another for response? What eye hath seen thee? or ear heard thee? Art thou the child of honest parentage? or was thy progenitor the father of lies?

Shall I declare war upon the opinions of authors whose works stand as monuments of their greatness, and will continue to stand when fanatical and visionary theories shall have passed away? Shall I arrogate to myself superior judgment, greater keenness of thought, a peculiar vision, and recklessly plunge into these men's opinions, expecting to make you believe that I am greater than they, and that all that they have said is but the fancy of the brain? Shall I take hold of the causes of toothache, and, in my imaginings, ransack the human system to find some disaffected molecule, and swear that that is the offender, and that any man that denies it is a fool?

All this could be indulged in; but would it leave you any better idea of the subject? would I awake within you even a spirit of inquiry? would I add one jot to your stock of knowledge?

Dr. Harris says that toothache, as it is technically termed, is a symptom of some functional or structural disturbance, either in the part in which the pain is seated, or of some other part or parts of the body, but more frequently the former than the latter. Now, this statement of Dr. Harris is certainly very broad, and as indefinite as it is broad. In the language of Dr. Harris, intended to convey an idea of toothache, we find also the clear acknowledgment that to himself the subject is all a mystery. It seems to me his definition is nothing more nor less than this: toothache is a pain in a tooth or somewhere else.

Now, as broad as this statement is, as open to criticism as it is, I am not prepared to dissent from it. My experience in the practice of dentistry teaches me that we know but in part—that we are fearfully and wonderfully made! How strange a thing is man! Whence are we? whither do we tend? how do we feel and reason? “a spirit saturating clay; the brain a clockwork, and mind its spring; mechanism quickened by a spirit. Who can solve the riddle?”

It may be said of me that I am too much matter of fact; that in me there is no spirit of enterprise; that I am unwilling to advance, and ready to remain and tread the old paths marked for me by others.

When I hear the pioneers of the profession proclaim that they

have been crucified over and over again, that they are scarred from head to foot, I naturally shrink from becoming a pioneer. It is said that sages, diving with science, have but a profundity of words; they track for some new links the circling chain of consequence, and then, after doubts and disputations, are left where they began; at the bold conclusion of a clown, things are, because they are.

I detest drones; yes, I hate them from my very soul. But a drone will sometimes sit in composure to witness falling into obscurity the bastard steps of science. Give me the old path that has been marked out by experience. Give me the path where order and common sense have been the guide, and I will tread it until experience and common sense teach me to tread another. I want no silly imaginative structure, though it may have the pretense of being built on the apex of science.

With reference to the treatment of toothache, there certainly has been a great advance on the part of the profession generally. Thousands of teeth that a few years ago would have been condemned are now saved. I have extracted thousands of teeth that I might have saved, and rendered useful, as well as ornamental, for years. And I am compelled still to extract teeth that I could save. I am not the disposer of my patients' wishes or circumstances, and I do not feel that I have done a criminal act in doing as I have done. My time is mostly taken up, and many of my patients are not able to pay the expense or spare the time for a long operation, and many of them have not the patience to submit to the treatment necessary to a successful operation. And when I discover that penuriousness enters largely into the composition of my patients, and that that is the great objection to my saving the tooth, I feel warranted in letting my patient take the consequences of his own neglect; or when the patient is unable to pay, and wholly a stranger, with no claims upon me further than one citizen upon another, I feel that I am doing God's service in relieving him of pain, by extracting the tooth.

Charity begins at home, and the man that will not look first to the interests of his own family is an infidel. Perhaps if I should charge Mr. A. so much for an operation as to be able to give Mr. B. one, I could afford to do so. But I am not here to set right the unequally distributed good things of this world. I do not believe that it is my mission to take from one man more than I ought, in order to practice benevolence to another.

I have always found that, in this world, many persons are exceedingly liberal with other men's money. But one dollar more than is right, taken from a millionaire, though the taker distributes it among the poor, is downright robbery, and the taker as much a thief as the professional pickpocket. The owner of that dollar is the person to determine where it shall go, and not the man who shrewdly or thievishly takes it from him!

True charity is in making a sacrifice of your own, and not that of another's! There are those who love to go in long clothing, and love salutations in the market-place, and the chief seats in the synagogues, and the uppermost room at feasts, which devour widows' homes, and for a pretense make long prayers; you know their condemnation. If a patient is ready to pay me a reasonable compensation for my labor and skill to save an aching tooth, it is all that I ask. I will not impose upon him by an excessive demand, for my inspiration in the part of attendant angels, that I in my visions see around me. God's angels are not sent to me to teach me how best to rob my patient, or that this or that man has money that I ought to take from him and give to another. God has given me my faculties that I should honestly use them to my own best interests, and in that I glorify Him! And when I am filling a tooth it is not His wish that my mind should be rambling in the spheres above, while my fingers are manipulating on the footstool below. When this mortal shall have put on immortality, then the things of time and sense cease, and man goes home to learn still further the mysteries of Heaven. And I pray that in the records of Heaven, after the trial scene of time shall have passed, there shall not be found attached to my name the word—extortion!

Again, if a patient presents himself for an operation upon an aching and broken-down tooth, it is my duty as a Christian man, as far as in me lies, to determine the probabilities of success, and whether what I propose to save will, after completion, be worth to the individual what he has paid for it. We are to be the judges of what, under the circumstances, will be best; the patient comes to us with that expectation, and if I go on and perform an expensive operation, accompanied with much pain, and great loss of time to the patient, because in his confidence in me he assents to it, I abuse that man's confidence, and, from selfish motives, rob him of his money! I had better have taken from him his tooth!

Again, with me it is a settled conclusion, that there is scarcely a diseased condition but that by patience on the part of the patient, and skillful operation on the part of the dentist, with dame nature as nurse, can be rendered comparatively healthy. But it is not with me a settled conclusion, that I can marry life and death without injury to the living.

A little leaven leaveneth the whole lump. One diseased molecule may send its poison through the whole system, and death may be the consequence, while we little suspect the origin of the trouble. I confess I am not clear upon the subject, but if there is a shadow of truth in the proposition, there is a fearful responsibility resting upon those who willfully and conceitedly persist that they understand the mysteries of God's strange man!

It is useless for me to tell you how I would proceed to save

an aching tooth; you are all well posted, and I doubt whether in the whole dental profession there can be found the same number of dentists as capable. You know the instruments; you know the remedies; and you know how to use them! And God grant that with them you may use your best judgment in trying to relieve and benefit suffering humanity.

TREATMENT AND FILLING OF PULP CAVITY.

BY JOHN N. FARRAR, D.D.S.

THESE cases present to the dental practitioner a wide field upon which to bestow his skill, and in order to meet with a good degree of success, he not only must possess a good degree of mechanical ingenuity, but he must have a fair knowledge of anatomy, physiology, pathology, and therapeutics. Without these, no person can expect to be a proficient in this profession. He may be able to perform operations both in the mechanical and operative departments, and meet with fair success in a great proportion of the cases which may come under his care; but the more complicated ones which are constantly presenting themselves to the dentist of extensive practice, will often involve him in serious difficulty, and much to his discomfiture, he is obliged to extricate himself from the mortifying circumstances the best way he can.

For a long time the idea of preserving a pulpless tooth was considered erroneous and foolish, but the perseverance of a few of the leading minds of our profession, who fought their way through many discouraging and sometimes fruitless attempts, step by step developed and brought to light the fact that this class of teeth could be preserved, and be of great value to the patient for many years.

The *modus operandi* differed considerably, but as the science advanced new facts were brought to light from time to time, until within a few years, the profession has settled for the most part upon one or two systems, so that the doctoring now is both simple, and, as a general rule, certain of success, though of course there are some exceptions to this rule.

These operations can better be treated upon, by dividing them into *three classes*:—

First. When the pulp is exposed and alive.

Second. When there is alveolar abscess.

Third. When the pulp has dried, and has not been followed by an abscess.

There are cases which require a deviation from the following modes of operations, as there are exceptions to all general rules. In such cases the practitioner must be governed by his judgment as to the best policy, according to the nature of the case. Good common sense is a most capital friend and adviser, and should always be consulted.

The first thing to be done when a tooth of this class is placed under our care, is to ascertain its condition, and the probable chances of successful treatment. Sometimes the operator is justified in removing the tooth at once, on account of its almost necrosed condition, looseness from absorption, or wasting away of the surrounding parts, advanced degeneration of some of its tissues, or from the fact of its being an exciting cause of some malady, such as disease of the antrum, facial fistula, or some constitutional disorder.

Perhaps we need not have mentioned this, for seldom is the preserving treatment advised in these circumstances; more teeth are extracted than is necessary, and many which might be preserved by skillful treatment, thereby giving the patient great pleasure and comfort as well as great service for years.

The modes of destroying the exposed live pulp are somewhat numerous; but not deeming it necessary to enter into details of dental history, it will be sufficient to state that the actual cautery and the punch, and various other instruments for accomplishing this object, to say nothing of the excruciating pain occasioned by them, have given way to the almost painless mode by the use of drugs, which renders the operation vastly more pleasurable to the patient, and clears away much of that horrid fear possessed by many people, especially children, of a dentist.

This preparation of drugs, generally called arsenical paste, is composed of three ingredients, viz.: acidum arsenicum, morphia sulphas, and creosotum, mixed together in a mortar for about thirty minutes. The relative proportions of which vary somewhat by different operators. The two principal formulas employed by most dentists are known to me as those of J. D. White and C. N. Peirce, viz.:—

DR. WHITE.

R.—Arsenious Acid, grs. xxx;
Sulphate of Morphia, xx;
Creosote, q.s.

M. To form a thick paste.

DR. PEIRCE.

R.—Arsenious Acid, grs. x;
Sulphate of Morphia, xx;
Creosote, q.s.

M. To form a thick paste.

The writer prefers the latter, because there is not that liability of trouble from periodontitis which sometimes occurs if strict care is not observed on the part of both the operator and the patient. By proper management, however, there is no trouble, and either formula is equally good.

Sometimes a preparatory treatment is necessary if the pulp is highly inflamed, because the paste will not always readily act upon such, the absorbents being incapable of taking up the arsenic when the inflammation has extended beyond a certain point, but if an application of morphia and creosote, or morphia and tannic acid, be made and followed by the paste after the lapse of a few hours, or a day or two, a most salutary effect is produced generally, causing, as a rule, little or no pain.

Having removed the foreign and decayed matter sufficient to expose the pulp, apply a small portion of the paste, the size of a small pin's-head, on a very small tent of cotton, or, which is better, if the paste is of sufficient consistency, apply it directly on the exposed pulp without cotton.

After the application of the paste and before the patient is allowed to close the mouth, pack a tent of cotton of sufficient size, first saturated in sandarac varnish, into the cavity, thus effectually shutting in the poison. The sandarac preparation unites with the albumen of the saliva, which forms an insoluble compound which hardens the filling, thus making a very excellent temporary plug not only for these particular cases, but it is good for many similar circumstances.

It is well to allow but a small portion of the varnish to be present in the cotton tent before applying, to avoid the disagreeable taste which it produces if allowed to flow over the mucous membrane, which, to some patients, is quite annoying. This may always be avoided to a great extent simply by giving the saturated tent a gentle pressure within the folds of a napkin.

The quantity generally employed to destroy a pulp is about the one-twentieth of a grain of the arsenious acid, which acts as a destroyer of the vitality of the pulp. The addition of sulphate of morphia to the caustic, diminishing the pain very materially by its narcotic properties. The creosote being styptic, narcotic, astringent, antiseptic, and escharotic, proves to be an excellent constituent of the paste. Creosote possesses the properties to form with albumen an insoluble compound. It has also the peculiar power to cause inflammation on healthy tissues, and a healing power for inflamed parts. After this paste has been applied, the morphia narcotizes the nerve, while the absorbents take up the arsenic and convey it along the pulp, sufficiently far down to stimulate it to a high degree of inflammation.

Now, the pulp being confined in a close, bony, walled space, and the slender neck of the pulp being also confined within the unyielding foramen, it has no chance to swell when it becomes inflamed, consequently this mere thread or neck of the pulp becomes strangulated before the arsenic reaches the foramen. The supply of nutrition or blood thus being cut off, the pulp soon begins to yield to the destroying foe, and in a

short time passes beyond the point of possible resolution, and dies from jugulation and poison. The creosote now comes in to do its duty by antisepticizing the lifeless pulp and preventing further decay, and also hastens the line of demarkation between the dead body and the live tissue outside.

The destroying action of the arsenic paste commences at the point of contact, and slowly extends down the pulp. The time necessary to destroy the vitality of a pulp varies according to the formula by which the paste is compounded, also by the age of the patient and condition of the pulp.

If the formula of J. D. White is used, we generally let it remain in the tooth from twenty to thirty-six hours in adult cases, and from eight to twelve hours for children, and no longer; unless by examination the pulp proves to have been in a condition not susceptible to the influences of the paste, when, sometimes, it requires to be repeated and allowed to remain a longer or shorter time, as the case demands, but be sure and not let it continue too long; better examine often than let it remain over the required time, for if that be the case, the effects of the destroyer may pass down through the foramen at the apex and cause severe periostitis.

There are different opinions as to how the arsenical paste does its work. Dr. Ellis says "that the arsenic will not and cannot pass through the foramen, unless abnormally large. And even in such cases he has never witnessed difficulty which could be attributed to the influence of the arsenic, and to prove it he and one of his colleagues have made numerous experiments by preserving all of their pulps thus destroyed, and having cut off the small extremity of each, tested these terminal filaments chemically for the drug and could not find the ghost of arsenic present." He prefers to use about the one-fiftieth of a grain at a time, and let it remain in the tooth two weeks. Says it does no harm, and thinks it better to let it remain even longer, rather than inflict the slightest pain by the withdrawal of the pulp.

Occasionally the dentist will come across people who are very peculiarly susceptible to the influences of arsenious acid, the minutest portion of which producing inflammation of a violent character. It is our duty as dentists to notice the idiosyncrasies of our patients and act accordingly, permitting the paste to remain in the tooth but a short time without an examination, and remove it upon the slightest signs of too severe action.

If Prof. Peirce's formula be employed, which, taking all things into consideration, we think is the better and much safer, the time allowed to destroy the vitality of a pulp is subject to the same variations as in the other formula, but it is not apt to be followed by as serious results if the paste remains longer than the appointed time,

which sometimes happens if the patient is negligent about the directions given for its removal, "for patients will not always do as we would have them." The time required for the necessary result is from twenty-four to forty-eight hours, and from ten to fourteen for children. In a great majority of cases twenty-four is sufficient for adults, indeed I might say almost all. It should be the invariable rule of the dentist to make an examination at the expiration of this time. "An ounce of prevention is worth a pound of cure."

"It is a good rule," says Prof. J. D. White, "never to apply the paste to an aching tooth, or if the patient have a fever flush upon the cheek, in the evening, because the irritating effect of the arsenious acid under such circumstances is very liable to cause considerable pain and disturbance of sleep; but if the patient has *no pain*, and the cheek is pale or anæmic, there is little or no danger, owing in a great measure to the low vitality of the general system." Sometimes the pain of an aching tooth is increased for thirty or sixty minutes after the application of the paste, but after that it dies away, causing no trouble afterward. At the expiration of the time thought necessary to cause death of the pulp, remove the cotton and wash away the remaining portion of the paste by injecting tepid water with a small syringe. Having done this, then try to pass a small nerve broach down the fang as far as the apex to ascertain the condition of the pulp: if no pain is caused, it is proof that the part is dead; but if severe pain is occasioned by this operation, the probability is that the pulp is not entirely dead, and requires another application. Be sure, however, about this, for sometimes painful results will follow an incorrect diagnosis. Oftentimes this manipulation is accompanied with considerable pain upon the first introduction of the instrument, consequent upon its acting like a piston upon the dead pulp, forcing it down so as to press upon the live part at the external orifice of the foramen at the apex. Therefore, to diagnosticate correctly, we should rotate the instrument carefully, gradually forcing it down the canal, causing sometimes considerable pain, but not of so severe a nature as to be unbearable. If the pulp is wholly dead, the instrument can, in a short time, be carried to the apex, at first causing considerable pain, but after reaching the apex little or no pain is experienced by playing the broach to and fro. After ascertaining the pulp to be lifeless, the next thing to be done is to apply a small tent of cotton saturated with creosote over the exposed dead pulp, followed by a cotton and sandarac tent. Great care should be observed in the introduction of creosote to protect the lips and tongue, for it acts as an escharotic on the mucous membrane. This should be allowed to remain several days; a week or two is a good rule, sometimes a longer time is better. There are, however, different opinions as to the length of time, some claiming that the sooner a pulp canal is filled with gold after the death of the pulp the better, but this seems to the writer wrong.

By the styptic, astringent, and antiseptic properties of the creosote, the dead pulp hardens, consolidates, and contracts, and, being antisepticized, produces no deleterious effects by its presence, while the creosote proves an excellent remedy for reducing any inflammation that may be present in the contiguous periosteum clothing the root of the tooth. Sometimes it is good, and perhaps in all cases, to remove a portion of the chamber pulp to give more room for the creosote plug, especially if the cavity is quite small. This should remain until by nature a line of demarkation has been established between the neck of the pulp and the surrounding periosteum outside, thus giving time for the collateral circulation of the blood by the anastomosing vessels, and the ultimate healing of the wound.

Now the pulp may be removed with much greater ease than it could have been if attempted before, when no separation was formed between the dead and live tissues. After removing the pulp, which is done by means of a fine broach barbed at the free extremity, a small tent of cotton is twisted around the barbed point of another broach so as to form a swab the size of the canal, and having saturated it with creosote, pass it into the fang, playing it back and forth until every particle of the decayed matter is removed. By this operation the canal is not only cleared of the dead pulp, but the tubuli become filled with this antiseptic, thus preserving from decay the endostium or lining membrane of these tubes, which is done by the albumen contained in them becoming hard or changed into an insoluble compound by the creosote. Albumen seems to be the first to change and the real cause of putrefaction, and by the use of creosote this is prevented, so that when we have stopped the mouths of these tubuli by gold being packed against the walls of the pulp canal, they become as it were hermetically sealed, thus preventing any further decay.

If, by the long retention of the arsenical paste, periodontitis or inflammation of the dental membrane is produced, which can always be discovered by a slight tap or pressure upon the tooth, it is not in a fit condition to fill until the pain entirely subsides. To effect this we generally fill the pulp canal with floss-silk and creosote, allowing one end to protrude from the orifice of the cavity, to enable its easy extraction when desired. Allow this to remain a few days, examine it from time to time until the inflammation and pain have entirely subsided.

Some people are peculiarly susceptible to the action of creosote, which seems to irritate and make things worse. In such cases a good result will often follow from the use of nitrate dulc in place of creosote; at the same time make a free use of the lancet, scarifying the gums about their free margins in several places about the diseased tooth, sometimes depositing in the wound a small tent of cotton, pressing it down to the alveolar process, and letting it remain until it comes out of itself. This prevents too immediate a healing of the wound, and causes a slight counter-irritation.

An application of one or two Spanish leeches to the gums is very excellent treatment in connection with some aperient medicine, taken with a view to a constitutional effect.

After drying out the canal with cotton or floss-silk and tissue paper, the next thing to do is to press down our first pellet of stopping; this may consist of gold, cotton, or asbestos, first saturated with creosote. We prefer cotton, and believe that it is generally preferred by the profession, because of its capability of absorbing creosote and retaining it, and at the same time is softer than the other materials. When this is properly applied it will cause no harm but great good by always being charged with a preserver of dead matter; and, as it were, standing like a police guard at the door, (foramen,) permitting no particles of harm to pass the foramen or any of White's* canals, without becoming first divested of all injurious properties by being antiseptized, thus preserving them from producing any deleterious effects. The virtues of this pellet will remain for years. There are, however, many cases where gold would be as good and perhaps the best of all things.

Having deposited our antiseptic foramen plug, we then proceed to pack upon it our gold, taking care to fill every portion tight and solid, proceeding now, as in ordinary operations, with the mallet and serrated instruments. Sometimes the canals of some of the posterior teeth are quite difficult to reach to fill them, because the operator cannot see where to manipulate. In such cases, where it is almost impossible to use metal, we have placed into the cavity several very small balls of creosoted cotton, and then taking the root plugger play it into the canals, raising the instrument out of the tooth every time and back again. Some of the balls of cotton will be taken along down some one of the canals nearly every time. Continue thus until all the canals are filled, then fill the main canal with gold. We have yet to see the first case filled in this way a failure because of the cotton. Understand me, I say that gold is best in all these cases if a good filling can be obtained, but cotton had better be employed to fill roots of teeth, if gold cannot be put in. Any tooth may be filled with gold, unless it be some abnormal, small, crooked canal of a posterior molar.

AMALGAM.

BY A. LAWRENCE, M.D., D.D.S.

In the June number of the DENTAL COSMOS, page 606, under the head of "Practical Items," a remedy is suggested for an alleged defect in my amalgam. The proposition is to add a certain amount of cadmium—thus making it no longer Lawrence's Amalgam.

* So called from the fact that they were first accurately described, and their physiological and anatomical relations in regard to dental surgery elaborately treated of by him.

My amalgam is composed of silver, tin, and platinum only, and I cannot, with my present views on the merits of cadmium, consent to add that metal in any quantity, nor advise its addition by others. My remedy is to use the purest mercury, less of it, and follow the printed directions, a copy being here appended.

DIRECTIONS.—Put into a small Wedgewood or glass mortar a small quantity of mercury, and so much of the filings as may be required for the time being, and, with the pestle, rub the contents into a stiff paste; add a spoonful of alcohol, and continue the rubbing until the liquid becomes quite dark; then pour it off, and remove the amalgam to a dry cloth, with which completely absorb the moisture. Press out the superabundant mercury by any means preferred, and it is ready for use.

PROCEEDINGS OF DENTAL SOCIETIES.

MASSACHUSETTS DENTAL SOCIETY.

BY THOMAS H. CHANDLER.

THE second annual meeting of this Society was held in Boston, on Thursday, May 18.

The usual reports were read and accepted, showing the Society to be in a flourishing condition.

The number of its members has more than doubled during the year. The library and cabinet have made an excellent beginning; and the treasury shows a large balance on hand. The charter granted by the Massachusetts Legislature at its last session was accepted, and the Society is now an incorporated body.

The following named gentlemen were chosen officers for the ensuing year, viz.:—

President, N. C. Keep, M.D.; *Vice-President*, E. G. Leach; *Recording Secretary*, T. H. Chandler; *Corresponding Secretary*, E. C. Rolfe, M.D.; *Treasurer*, S. J. McDougall, M.D.; *Librarian*, E. N. Harris, D.D.S.; *Executive Committee*, Drs. A. Lawrence, J. T. Codman, H. F. Bishop, T. B. Hitchcock, and S. F. Hawe.

The following named gentlemen were chosen to represent the Society in the American Dental Association: Drs. Wetherbee, Lawrence, Keep, Leach, Bishop, Harris, Gerry, Shepard, Rolfe, and Hitchcock.

Dr. I. J. Wetherbee was appointed to deliver the address at our next annual meeting, with Dr. E. C. Rolfe as his substitute.

The following preamble and resolutions, offered by Dr. Wetherbee, being substantially the same as were adopted last year by the American Dental Association and American Dental Convention at their annual meetings, were unanimously passed, viz.:—

Whereas, in the opinion of the Massachusetts Dental Society, not less than two years pupillage in the office of a competent dentist, and attend-

ance upon two full courses of lectures in a dental college, will qualify an individual to practice dentistry properly; therefore

Resolved, That practitioners of dentistry be requested not to receive into their offices students for a less term than two years; and under no consideration unless they agree to attend lectures in and be graduated from a dental college before entering upon the practice of the profession.

Resolved, That it is the duty as well as the interest of the people to require of all who hereafter enter on the practice of dentistry, that they shall have received in course a diploma of graduation from a dental college, as the first requisite for public confidence and patronage.

Resolved, That these resolutions be published.

The President, Dr. N. C. Keep, then delivered an earnest and eloquent address, which was listened to with interested attention, eliciting repeated bursts of applause. At its conclusion it was voted, "that the thanks of the Society be tendered to our honored President for the kind words of advice and encouragement he has given us, and that a copy of his address be requested for preservation in our archives and for printing." Also, "that the annual address be published in pamphlet form for the benefit of the members." Also, that a condensed report of the proceedings of this meeting be published in the dental journals, and in such of the city journals as the Secretary may see fit.

At the conclusion of the business, the members adjourned to the Tremont House, where they partook of an excellent dinner, and enjoyed therewith many excellent speeches from the gifted among their number.

MASSACHUSETTS DENTAL SOCIETY.

A MEETING of the Massachusetts Dental Society was held on Monday evening, June 5th, at which, after the transaction of the regular business, Dr. L. D. Shepard, of Salem, Secretary of the CONNECTICUT VALLEY DENTAL ASSOCIATION, stated that Dr. J. H. McQUILLEN, of Philadelphia, was to deliver a lecture before that body, at Northampton, Mass., Tuesday, 13th inst., and extended a cordial invitation to all members of our Society to attend. He then moved, and it was voted, "that we have a special meeting on Thursday, 15th inst., and invite Dr. McQuillen to deliver an address to us, and that we pay all his expenses." It was also voted, on motion of Dr. Wetherbee, "that we invite the AMERICAN DENTAL ASSOCIATION to hold their next meeting in Boston."

On the evening of Thursday, 15th inst., in accordance with the vote of the preceding meeting, a special meeting was held, in full numbers, to hear the lecture. Dr. McQuillen was introduced to the Society by the President, Dr. Keep, and after the applause at his appearance had somewhat subsided, proceeded, after a few preliminary remarks, to deliver a most lucid and instructive lecture on "Audition with special applications to Dentistry."

The Anatomy of the Organ of Hearing was first carefully described,

and its division into three portions, the *External*, *Middle*, and *Internal Ear*, made the more instructive by large papier-mache preparations employed in illustration of this part of the subject. These preparations are so constructed as to admit of the most complete dissection, and owing to their greatly enlarged size, over the natural specimens, each part was fully and clearly demonstrated to the eye of every one in the room.

The philosophical consideration of *sound*, and the three modes of its propagation, by *reciprocation*, by *resonance*, and by *conduction*, along with other points of interest and importance, were then dwelt upon, in connection with the physiology of hearing.

The practical applications at the close, had a decided bearing upon the profession, and if generally observed by dental practitioners, would not only tend to enhance their own comfort and that of their patients, but also contribute largely toward securing marked professional success.

That best compliment to a lecturer, the interested attention of his hearers, was given in full measure, and the burst of applause as he closed marked the appreciation in which his words were held.

After the lecture, Dr. Atkinson, of New York, who was present, in company with Dr. McQuillen, was called upon by Dr. Wetherbee. He at once responded, and entertained his hearers with a most earnest and characteristic speech, covering the whole field of knowledge, and the much larger one of ignorance. He showed how "blind leaders of the blind" are ever finding a "last ditch," in which themselves and their followers helplessly and hopelessly wallow; advised and urged a thorough casting off of the leading-strings of our "blind pilots into knowledge," and a taking up the search "each for self, and God for all," independently and earnestly, as the only way of reaching truth. Dr. Atkinson's manner and matter were peculiarly refreshing to his Eastern friends, possessing a flavor and a sparkle which made them to pass freely over palates long clogged with the sameness of accustomed sweets. His zeal for the cause is especially striking, and puts to shame those who, like the unfaithful servant, have so long kept their treasures buried, folded safely in their own private napkins. Their proper punishment is, to be like him, "cast into that outer darkness," and left there.

An animated discussion sprang up at the close of Dr. Atkinson's remarks, with regard to some arrangements by which the fare to Chicago could be reduced, so as to lessen the traveling expenses of the delegates to the AMERICAN DENTAL ASSOCIATION. In connection with this, Dr. Shepard stated that the subject had been canvassed by the members of the CONNECTICUT VALLEY DENTAL ASSOCIATION, and other dental societies in *New England*, and he had every reason to believe with such a combination that an agreement could be effected with the railroad companies which would be satisfactory to all parties. He also remarked that as the President of the AMERICAN DENTAL ASSOCIATION was present, it would no doubt be interesting to the members to hear from him

in relation to the efforts being made by the Executive Committee of the Association to secure for the meeting every possible advantage, whether viewed from a theoretical or practical stand-point. In response to this, Dr. McQuillen stated that, in addition to the reports of the various committees, the reading of volunteer essays, the delivering of extempore lectures, and the discussion of the various topics presented, Dr. W. W. Allport, and his colleagues of the Executive Committee, were making arrangements by which *clinics* would be held each day during the session. A number of operating chairs would be provided, so that ample opportunity could be afforded for several operators to be engaged at the same time. The hours of the clinics were to be so fixed as not to interfere with the regular proceeding of the Association. The indications warranted the conclusion that the meeting at Chicago would be the largest gathering of the dental profession that has ever taken place.

Dr. Codman then read a letter which he had just received from Dr. Allport relating to the subject under consideration. After some further discussion, on motion, the meeting adjourned.

Not a few went home from that meeting with new ideas, new aspirations, and higher resolves for the future. The advent of these distinguished gentlemen is as the first pulsation in the almost asphyxiated body of dentistry in this region; and that the circulation may continue until its whole system is filled with life, is the earnest wish of

THOMAS H. CHANDLER, *Secretary*.

THE CHICAGO DENTAL SOCIETY.

BY DR. JAMES C. DEAN.

THE regular monthly meeting of the Chicago Dental Society was held May 8th, President George H. Cushing in the chair. After the regular business, the essayist for the evening, Dr. Dean, read a paper on filling teeth, which was subsequently very thoroughly discussed.

Dr. Ellis said our failures are too little discussed or brought forward. Had had severe trials the last two weeks with one of those very exceptional cases that occasionally are brought forcibly to our notice. Patient a young lady about sixteen years; teeth badly decayed and crowded; could not keep patient in position over a minute or two at a time; could not put a napkin in mouth on account of producing nausea; tongue uncontrollable, etc. Would like to see any of those dentists who proclaim at conventions and elsewhere, or through public dental journals, that they can *always, without fail*, keep the mouth dry, and control patients at will, take that case. Thinks filling cannot all be done by rule and theory. Often has cases that try a man's resources, and call for the very best skill and inventive faculty. Uses amalgam; has never seen any bad results from its use. Likes rapid wedging, and does a great deal of it.

Uses the mallet, and thinks it saves time and labor; also its use is easier for both patient and operator.

Dr. Fuller prefers rubber for separating teeth; uses it about twenty-four hours and then inserts a pine wedge.

Dr. Freeman prefers cotton for separating teeth, and thinks there is much less inflammation attending its use than by the use of rubber. Has used Wood's metal in teeth in the mouth once or twice, but don't like it.

Dr. Dean suggested that Dr. F. had not sufficient practice to enable him to use it effectively or successfully.

Dr. Fuller fills sensitive teeth with Hill's stopping, letting it stay in the cavity from one to six months, or longer, and has good success in accomplishing the object.

Dr. Sherwood thinks the efficacy of the file is in danger of being overlooked. Had his teeth, all the superior anterior ones, filed apart to the extent of one-third of the substance of the crown twenty-nine years ago, by Dr. Bigelow, of New York, and have been thoroughly preserved since and good to this time. By request gave the members present an opportunity of seeing them, and demonstrating in his case that filing had not injured his teeth except as to shape. Uses soft foil principally, more than adhesive. Thinks there have been more bad fillings (since adhesive foil came into use, or more particularly sponge gold) within the last five years than in fifteen years when soft foil was used exclusively. Uses amalgam of the precipitated silver and mercury, and squeezes out the mercury through buckskin with pliers. Washes out the oxide with alcohol.

Dr. Cushing wedges very gradually with pine. Uses adhesive gold almost entirely; it must be thoroughly worked. Uses amalgam occasionally, but never likes to only when nothing else could be used. Thinks the quick wedging rather severe, and patients prefer the more gradual way.

Dr. Dean agreed with Dr. Ellis that a good dentist must be skillful and capable of devising ways and expedients for the very many difficult operations that are constantly presenting themselves, and referred to the same idea as presented in his essay. Was glad the essay had called forth such an interesting discussion, and thereby accomplished the end sought to be obtained by it. Uses annealed gold almost entirely, and referred again to his essay to show that in advocating annealed or adhesive gold he made a point therein that it must *always be thoroughly packed*. Likes the quick wedging if the patient will endure it, also thinks that there will be less inflammation attending it. Thinks an anæsthetic influence may be had on the nerves of teeth thus separated by a sort of strangulation, the nerve being confined between the edges of the foramen, at the apex of the root and the edge of the entrance of the nerve canal at the bottom of the socket, and the said edges pressing toward each other and preventing sensation from being conveyed through the foramen at

the apex. Likes Wood's metal very much ; has used it about two years, and substitutes it for amalgam whenever it can be done. Has had such patients as described by Dr. Ellis, and thinks also with him that patience almost ceases to be a virtue under such circumstances.

Dr. S. S. White, of Philadelphia, was called on for some remarks. He spoke of the interest he had always taken in the formation of dental societies. Had the pleasure of uniting in the organization of the Pennsylvania Association—the second local society formed in the United States. Regarded the formation of numerous societies within the past few years as sure evidences of progress. Illustrated the advantages of association by the mirror, as used to reflect light. Each one present to-night, serving as a mirror, has made the subject under discussion more luminous by the concentration of the reflected rays than it would otherwise have been, although the amount of light has not been increased. Urged the advantages of professional intercourse, even to those better informed than others, with more to communicate than they could hope to receive, on the ground that it is as true now as when the Great Teacher of the science of life and its relations declared it : “It is more blessed to give than to receive ;” that it remains as of old, “There is that scattereth and yet increaseth ; and there is that withholdeth more than is meet, but it tendeth to poverty.”

There is no better way for one to prove a real superiority than to demonstrate his ability to give that which others need ; and giving knowledge does not impoverish, nor withholding enrich any man. This great fact is better understood now than formerly ; and many in the profession furnish the proof that those who give freely of their knowledge do not suffer thereby, but are themselves developed and securing the thanks, respect, and esteem of their fellows, do also attain to an ability in the practice of their calling which brings the material reward which others vainly strive for, by seeking to retain their scraps and fractions of knowledge.

Dr. S. S. White recommended that the Secretary should take notes of the remarks of each member and request each one, at an early period after the meeting, to make a concise report of the most important points from such notes furnished by the Secretary, so as to enable him to make a report to be published in the dental journals.

NORTHERN OHIO DENTAL ASSOCIATION.

BY L. BUFFETT, D.D.S.

THE annual meeting of the Northern Ohio Dental Association was held at Warren, Tuesday, May 2d, 1865, Dr. C. Palmer, Vice-President, in the chair.

Members present : Drs. Huntington, C. R. Butler, B. F. Robinson, F. S. Slosson, B. T. Spelman, W. H. Atkinson, C. Palmer, J. C. Whinnery,

A. E. Lyman, W. P. Horton, L. Buffett, A. Terry, J. Greenfield, J. E. Robinson.

Drs. C. H. Harronn, L. A. Beattie, J. Chesebrough, C. C. Carroll, H. H. Newton, A. M. Phillips, F. S. Whetsler, were elected members of the Association.

Drs. Taft, J. A. Robinson, and W. S. Palmer were elected honorary members.

The officers elected for the ensuing were:—

President, Dr. F. S. Slosson; *Vice-President*, Dr. C. Palmer; *Recording Secretary*, Dr. L. Buffett; *Corresponding Secretary*, Dr. B. F. Robinson; *Treasurer*, Dr. C. R. Butler.

Drs. Slosson, Harrison, Whetsler, Beattie, and Carroll were appointed delegates to the American Association.

Several essays were read; two by Dr. Chesebrough. Subject of the first: "The Duty of the Dentist to the Profession, to His Patient, and to Himself." The second one, "Sympathy between the Teeth and other Parts of the Body."

Dr. Atkinson read one on "Bleaching Teeth," and one on "Teaching."

Dr. Buffett, one on "Arsenic."

Dr. C. R. Butler, one on "Forces."

The following subjects were then discussed:—

1st. "What means have been found most successful in arresting the progress of decay in human teeth?"

2d. "What principles should govern dentists in the practice of their profession?"

3d. "What treatment is best adapted to prevent and cure alveolar abscess?"

4th. "Artificial dentures."

5th. "Dental fees."

The session continued until Wednesday evening, May 3d.

The Association adjourned to meet at Toledo on the first Tuesday of October, 1865.

The next annual meeting was appointed to be held at Painesville, Ohio, on the first Tuesday of May, 1866.

AMERICAN DENTAL ASSOCIATION.

THE fifth annual meeting of the American Dental Association will be held at Chicago, Ill., on Tuesday, July 25th, 1865, at 10 o'clock A.M.

It seems almost unnecessary to impress upon delegates the importance of their presence, since the very large attendance last session was a signal demonstration of the interest and sympathy of the profession, which, of itself, will undoubtedly prove sufficient to establish the popularity of an Association based upon representative interest.

The preparation of voluntary essays is at this time urged upon delegates not occupying positions upon any of the various committees, as every such contribution will serve to render the proceedings additionally interesting and profitable.

In connection with the ordinary exercises, clinics will be held, and the various dental operations performed.

GEORGE W. ELLIS, Philadelphia,
Corresponding Secretary.

AMERICAN DENTAL CONVENTION.

THE eleventh annual session of the American Dental Convention will be held at White Sulphur Springs, Ohio, on the first Tuesday of August, 1865, at 10 o'clock A.M.

BUFFALO DENTAL ASSOCIATION.

THE first annual meeting of the Buffalo Dental Association was held June 5th. The following gentlemen were elected officers for the ensuing year:—

President, Dr. R. G. Snow; *Vice-President*, Dr. B. S. Brown; *Secretary*, Dr. Geo. B. Snow; *Treasurer*, Dr. A. P. Southwick.

The retiring President, Dr. Geo. E. Hayes, read an address, a copy of which was requested for publication.

The following subject was discussed: "The Best Method of Taking Impressions."

Adjourned to meet on the first Monday evening in July.

GEO. B. SNOW, *Secretary.*

IOWA STATE DENTAL SOCIETY.

THE next regular meeting of the Society will take place at Dubuque, beginning Tuesday, July 18, 1865.

Our object is to give all who attend this meeting an opportunity to go right from Dubuque to Chicago, to the "American Dental Association." We therefore cordially invite our Eastern brethren to start for the "American Dental Association" one week sooner, and attend the Iowa State Dental Society.

WM. O. KULP,
Corresponding Secretary.

MUSCATINE, IOWA, June 1, 1865.

EDITORIAL.

ANNOUNCEMENT.

THE time has come when, by request of the publisher of the DENTAL COSMOS, my relationship with it shall cease as editor. My record I need not refer to, as that will stand for what it is worth for all time to come. For the publisher I can say that his course has been marked throughout, up to this time, with the most liberal disposition to favor the interchange of opinion and experience of every member of our noble art; and but for that, and other journals under similar circumstances, God only knows what would have been the condition of our profession at the present time. No journal has yet in our profession been self-sustaining; and without the combined interest of those engaged in other branches of our art, other than the office practitioner, where now would our science and literature have stood? To him I extend my heartfelt thanks for all he has done for the profession, and part with him with the highest regard and fullest friendship. For the profession, who have indulged me in my long career of over eighteen years, I have to thank for their patience and good-will. I have received letters of compliment from them, from time to time, that would fill a respectable volume, for the encouragement I had given them; for this I require no reward, and if errors have been made by me, (and who has not?) I have no apology to make, as all that I have done has been in earnest and for the general good, and not for self. I leave my task with many regrets, as I may not have so close a union with my brethren of a profession I love, as has favored me during my past career; but when I say farewell, it is meant from the bottom of my heart, and let whatever difference may have been between my brethren on professional matters be past forever, and whatever intercourse may take place hereafter be as new things on the face of the earth.

J. D. W.

PAIN IN DENTAL OPERATIONS.

SINCE writing our article for the last number of the DENTAL COSMOS, on the above subject, several persons have requested us to say more about it. If we could not, in a decisive manner, obtund pain in teeth preparatory to plugging, we could not be contented to practice dentistry. We should make it as comfortable to our patients while operating as possible, as well as to obtain the highest results of successful operations; this latter result cannot be obtained unless both patient and operator are reasonably comfortable. We cannot school ourselves to indifference while operating if the patient is writhing in pain or distress under our hands, especially if we know it is in our power to make it otherwise. In former times, when there were no palliatives known, we can easily im-

agine how necessary it was for the dentist to operate with an iron hand and a stoicism equal to obtaining the best results for his patient's good. In general surgery the same principle was practiced,—but how changed is that department of the healing art! Anæsthetics have swept away the terror of the knife and the lancet. Even the grinding and writhing pain of parturition, bequeathed by mother Eve to all her daughters, is now stripped of its dread. And should we be laggards behind? The emergency in surgery, obstetrics, and medicine, where life is in danger, knows no law but final results; hence the highest principles of moral courage of operator and patient are necessary to be invoked. But with us it is not so. We can operate at leisure, if we do not allow ourselves to be overcome by mere convenience, at the expense of pain or suffering to our patients. While there are physical disabilities to bear pain, or idiosyncrasies in an otherwise good patient, especially with the young and the naturally nervous, they are not always in the mood or condition to withstand painful operations; every well-informed and skillful dentist will pay especial attention to this.

Some years since, two little girls, of a wealthy and highly nervous family, were taken to a distinguished dentist of our city, to get some trifling operations performed on their teeth; but one of them was very nervous, and could not consent to let the dentist operate; after much persuasion the little patient being still unable to submit, the dentist thought it was a part of his duty to turn parent, and “box its ears,” by way of moral suasion. The mother and aunt, who were present, were so outraged and overcome that they took the child away without a word of reproof to the dentist. After some deliberation, the dentist called in the evening of the same day to offer some apology to the family for his rashness. He met the father of the child in the entry of the house, and he politely forbade him to enter further, as no apology was necessary.

It is a great mistake for a dentist to suppose that it is a part of his professional duty to administer “home discipline” to his little patients in his office at all under any circumstances. It is often true that small children do better in the hands of the dentist without the presence of either of the parents, as words of encouragement never come from them without some look or sign of sympathy, which unnerve little patients, even if they are not actually suffering. A certain strain is on their little hearts to bear operations at all, even if there be no pain attending, and a single word or look may break their chain of courage or forbearance, and all is lost for that sitting at least.

On one occasion we were operating for a little girl, an only child. She was much petted; she could not sit still for a moment, or keep silent; all the mother could do only added to the trouble. It had been accustomed to babble on at home, no matter how often told to cease. We did as well as we could, from time to time, until the six-year old molars made their appearance; we found that the sutures in the crowns

were open, and required plugging as soon as they were erupted; but still the child had no command of itself. We told the mother she must send the child alone, or with a servant. She said it had never been in the street alone, and she must accompany the child. Well, then, we said, we must quit operating, as the second teeth would require all our skill to save them. She said, then, she supposed she must submit. The child was sent with the servant. The child sat reasonably still, but never spoke a word. It is not often that young children are talkers, unless one or other of the parents are along with them. At two sittings, we made a very good plug; the bill was sent along, by request, three dollars. The next day we received the following note:—

"MY DEAR DOCTOR:—Please find inclosed five dollars, for Minnie's plug. Your charge was but three; I thought that would hardly pay you for your trouble, I therefore send you five; but for your kindness I can never pay you.

"Truly yours, E. T. L."

We often operate for children without speaking a word; they seem to comprehend all by the motions. When we approach the mouth, if we find they are suffering pain, we palliate. If the courage gives way, we send them home, to meet again and again until they gain confidence in themselves. Appeals and harsh words will never do,—indeed it is not policy or proper in the majority of older patients. J. D. W.

PUBLISHER'S NOTICE.

THE present number closes the sixth volume of the DENTAL COSMOS. The first number of the seventh volume will be issued August 1st. Dr. J. D. White retires from the editorial department. The journal will be continued under the supervision of the two remaining editors; Dr. J. H. McQuillen having charge of Original Contributions, and Dr. Ziegler of the Periscopic department.

REVIEW OF DENTAL LITERATURE AND ART.

BY J. H. M'QUILLEN, D.D.S.,

PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

A PROFESSIONAL VISIT TO NEW ENGLAND.—In compliance with an invitation extended to me by the CONNECTICUT VALLEY DENTAL ASSOCIATION, and a subsequent one by the MASSACHUSETTS DENTAL SOCIETY, to deliver addresses before them, I recently paid a visit to New England, which, as it was almost exclusively a professional tour, a brief description may not be uninteresting or unprofitable to the profession at large, as thereby some idea may be gained of the interest that is manifested on the part of our Eastern brethren in associated efforts. The knowledge of what they are doing may react beneficially upon the profession in other sections of our great and glorious land, and exercise such an influence

that eventually there shall not be a State or City in the North, South, East or West unrepresented in the AMERICAN DENTAL ASSOCIATION.

Starting from Philadelphia, I was joined in New York by Dr. Atkinson, and reached Hartford on Monday evening, 12th inst., where several pleasant hours were passed in company with a number of dental practitioners, eighteen in all, at the office of Dr. James McManus. Among those present was Dr. Riggs, who enjoys the honor of having performed the first surgical operation ever attempted upon a patient under the influence of anæsthesia, by extracting a tooth for Horace Wells, after inhaling nitrous oxide. The painless nature of this operation suggested to the patient that the agent employed might be used as an anæsthetic, and from this slight beginning came the great revolution which has since blessed millions all over the world, by rendering them oblivious to pain during the performance of the most terrible operations. In the course of the evening remarks were made by several of the gentlemen present favoring the establishment of a local dental society, and, as the result of that, the initiatory steps were taken by electing Dr. Crofoot chairman pro tem., and the appointment of a committee to prepare and report a constitution and by-laws at a subsequent meeting. On Tuesday morning, at an early hour, in company with several gentlemen, we started for the meeting of the CONNECTICUT VALLEY DENTAL ASSOCIATION, to be held at Northampton, Mass. After a very pleasant ride of a few hours up the Connecticut Valley, during which the charming scenery on each side of the river was fully enjoyed, the place of destination was reached, and at the appointed hour the members assembled in fair numbers, (some thirty-five in all being present,) and were called to order by the President, Dr. O. R. Post. The morning and afternoon sessions were devoted to the discussion of such practical subjects as the "treatment of irregularity," and the "filling of teeth." These were ably handled, and evidence afforded, not only of close intimacy with broad and correct principles, but also of ability to perform the most difficult operations in a highly skillful and creditable manner. With no apprehension of being regarded invidious, I would refer in particular to some operations performed, a short time back, for one of the members present, by Dr. Beals, also to some operations by Dr. Shepard for a student of Amherst College. Several interesting and instructive papers were read in the afternoon by Drs. McManus, Shepard, and Wolworth. The evening was devoted to a lecture on the Anatomy and Physiology of Vision, with practical applications to Dentistry. Quite early on Wednesday morning, through the courtesy of Dr. Jones, of Northampton, a large party was taken to the top of Mount Holyoke, and, after enjoying the fresh invigorating mountain air for an hour or more, they returned to town and entered upon the morning session with renewed vigor. A portion of the morning was devoted to clinical demonstration of the use of the mallet, by Dr. Atkinson. The "Cause of Dental Caries," and other subjects, were discussed during the remainder of the morning, and in the afternoon until the time of adjournment.

At 5 o'clock P.M., in company with several of those present at the meeting, we left for New Haven, and reached there at 8 o'clock, in time to join the BROOKLYN DENTAL SOCIETY, which held a meeting that evening at the residence of Dr. Wolworth. Some thirty-five members of the profession were present, among them Dr. Hill, of Norwalk. The subject for discussion, *Dental Medicine*, was spoken to by a number of those present; at the close of this the party partook of an excellent collation prepared for the occasion, and then separated, taking different railroad routes. Four of us, Drs. Atkinson, McManus, Shepard, and myself, entered the midnight train for Boston, which place was reached, after a comfortable night's rest, by taking advantage of a sleeping car, at 7 o'clock on Thursday morning.

Having been furnished, through the courtesy of my friend, Prof. Leidy, with a letter of introduction to Prof. Alexander Agassiz, the larger part of the morning was passed by us at Cambridge, in examining the great museum, which its founder, Prof. Louis Agassiz, intends shall include every conceivable variety of the animal kingdom, recent or extinct. The opportunities afforded in this collection to the student of Natural History, whether as a specialist or of the entire range of animated nature, are of the most superior and comprehensive character; owing to the exact and detailed classification which prevails throughout, to the dental student rare chances are here granted. Under the superintendence of the younger Agassiz, the worthy son of an honored sire, the necessarily slow and difficult work of arranging the vast number of specimens in the building is still progressing, notwithstanding the absence of the father, who is at present engaged on a scientific expedition in Brazil.

Among the thousand and one things presented too numerous to mention, is a rude stone hatchet, found in the Swiss lakes, along with other evidences of the high antiquity of man; this is estimated to be at least twenty thousand years old. The valuable museum of comparative anatomy belonging to the Cambridge University was also visited, at the suggestion of Prof. Agassiz, who gave me a letter of introduction to Prof. Wyman—one of the most exact and philosophical minds, combined with genial and pleasant manners, that it has ever been my privilege to come in contact with. Among the many interesting objects pointed out by him was a series of superior and inferior maxillæ, showing the dentition of the elephant from the earliest period up to the eruption of the last molar. The perfect familiarity manifested by Prof. Wyman with this difficult and intricate subject was truly refreshing to his visitors. Time was too limited to give even a casual glance at everything contained in this valuable museum, and to attempt to do justice to it in this meagre notice is impossible. It may not be amiss, however, to state that the most remarkable anomalies to which our attention was directed are three or four human spinal columns with *six lumbar vertebræ*.

In the evening a special meeting of the MASSACHUSETTS DENTAL So-

CIETY was held, with some forty members present, which I attended, and delivered a lecture on "Audition with practical applications to Dentistry." This was followed by a highly interesting and instructive address by Dr. Atkinson. A description of the meeting is presented in another portion of the magazine. This organization gives every manifestation of vitality, and is composed of gentlemen who have enjoyed all those advantages which are calculated to reflect credit upon the profession, and enable them to render high and valuable services to the community.

On Friday morning, two pleasant and profitable hours were passed, one with the Hon. Charles Sumner, the other with Prof. O. W. Holmes, and the favorable impression previously entertained toward each of them was enhanced by these interviews. In parting with the latter gentleman, we were furnished with a letter of introduction to Prof. Jackson, with the view of examining his Pathological Museum; although not successful in the effort to find him, the museum of Harvard Medical College was visited, and its many points of interest carefully examined, under the care of one familiar with the history of each specimen deposited. Before leaving the building, the scene of the murder of Dr. Parkinson by Dr. Webster was pointed out, and the details of the affair, and the identification of the remains, after their horrible mutilation by the murderer, through a set of block teeth made and recognized by Dr. Keep, were minutely described.

The visit thus imperfectly sketched was one which will not be soon forgotten by those who participated in it, for, as Dr. Atkinson truly remarked, the experience of ten years was compressed into a week; and it is sincerely hoped by the writer of this, that the brief account here presented may not be without some advantage to the profession generally.

DENTAL TIMES—APRIL.

"THE STEAM GAUGE IN VULCANIZING. By A. LAWRENCE, M.D.—In a short article of mine on Steam Pressure in Vulcanizers, which appeared in the December number of this journal, among other things, I alluded to the fact that I had dispensed with the thermometer, using a steam gauge instead; and stated some of the advantages secured, as I think, by the change.

"I am induced to offer what follows, from a belief that the article named was not sufficiently explicit so far as relates to the *use* of the gauge; this impression being strengthened by the receipt of letters of inquiry from several members of the profession in different parts of the country.

"That solutions to such queries as 'Will the gauge fit vulcanizers of different manufactures?' 'How do you ascertain the temperature in degrees?' 'What does it look like?' and 'What is the price?' etc., etc., are invited, does not surprise or annoy me in the least, for dentists, as a general thing, have had nothing to do with such an instrument, nor, until vulcanite came into use, with a thermometer even, except as the indicator of calorific fluctuations.

"Without further regard to 'Robin Hood's barn,' permit me to say to all interested, that the gauge most suitable for the purpose in question, somewhat resembles a small, circular clock; is about six

inches in diameter, and marked to register one hundred and forty or one hundred and eighty pounds pressure, with pound dots near the outer circle of the dial. A pointer indicates the force which moves it.

"This size is better than a smaller one, because the spring inside not being crowded to its utmost capacity in vulcanizing, will, of course, retain its working integrity longer; in fact, as long as any dentist now living will be personally interested in the matter. The price of such a gauge, at this time, is \$18; and, though more expensive ones can unquestionably be made, they are no more reliable, the difference consisting in mere 'outward show and adorning.' They can be used with all vulcanizers generating steam, connecting by means of three or four feet, or as much more as may be convenient, of small pipe having a U-shaped bend, or a single coil near and under the gauge to receive the condensed steam, as water alone should enter that instrument.

"The following table exhibits a range of pressures sufficient for vulcanizing purposes, with the temperatures necessary to produce the same:—

Pressure in Pounds.	Temperature.	Pressure in Pounds.	Temperature.	Pressure in Pounds.	Temperature.	Pressure in Pounds.	Temperature.	Pressure in Pounds.	Temperature.	Pressure in Pounds.	Temperature.	Pressure in Pounds.	Temperature.
60	295°	65	301°	70	306°	75	311°	80	315°	85	320°	110	339°
61	296°	66	302°	71	307°	76	312°	81	316°	90	324°	115	342°
62	298°	67	303°	72	308°	77	313°	82	317°	95	328°	120	345°
63	299°	68	304°	73	309°	78	314°	83	318°	100	332°	125	349°
64	300°	69	305°	74	310°	79	314°	84	319°	105	335°	130	352°

"It will readily be seen by the above, that a pressure of sixty pounds requires a temperature of two hundred and ninety degrees by Fahrenheit's scale to produce it, and eighty-five pounds three hundred and twenty degrees, at which latter pressure I vulcanize, running one hour, and with the most satisfactory results.

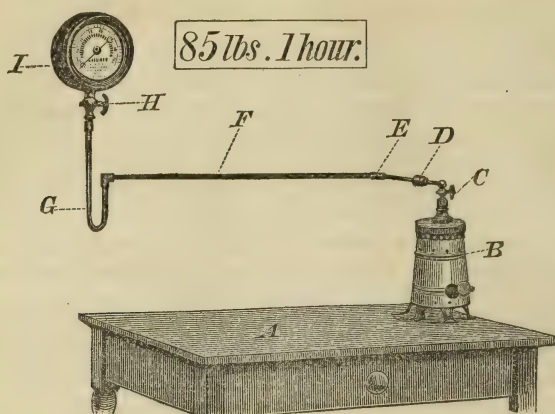
"The manner of putting up and using the gauge is very simple. All that is required is to secure it by screws passing through the flange on the back, in some conspicuous and convenient place, attach a pipe and carry it down ten or twelve inches, give it a bend or curve upward about half its length, or five or six inches, thence at right angles or otherwise, and in any convenient length not less than three feet, to the vulcanizer.

"The annexed cut is from a photograph of a Whitney vulcanizer with the gauge attached, but is by no means the only arrangement which can be made, as, in some cases, convenience may require more pipe, or a different distribution.

"A, Table or work-bench. B, Vulcanizer. C, Side outlet pendant cock screwed on in place of the thermometer scale. D, Coupling-joint. E, Angle in the pipe. F, Iron pipe three-sixteenths inside. G, U-shaped curve, five or six inches in depth. H, Cock to the gauge. I, Gauge.

"The fitting, putting up, and arranging the entire 'fixins' can be done

in an hour's time by any gas-fitter, or to those residing away from cities or towns where such mechanics are employed, can be furnished to order by them, or by the parties furnishing the gauge.



"All the joints, from the vulcanizer to the gauge, except the coupling, should be 'lead' with very thick lead paint, and screwed together steam tight.

"In using the apparatus, the cocks C and H must be turned straight with the pipe, for if shut off at either point the gauge cannot be acted upon by the steam. I generally heat the water in the vulcanizer nearly or quite to the boiling point, and let off the heated air by turning, or allowing to remain open, the cock C, then connect at the coupling D, turning the nut tight (not too tight) with a wrench.

"So soon as steam begins to form, it is condensed by contact with the cold part of the pipe, and falls into and fills the curve or coil with water, which is then forced into the gauge with a power indicated by the pointer on the dial. The pipe should descend a trifle from the angle E to the commencement of the curve, to facilitate the passage of the condensed steam to that point.

"Although vulcanizing one hour at eighty-five pounds affords results satisfactory to me, others may prefer a different time with more or less heat.

"The table will be found a guide in such cases.

"When the time is up, discontinue the fire, and shut off the steam by turning the cock C. Turn the cock H in the same manner, to prevent a too sudden reverse movement of the machinery of the gauge, the pressure on which should be gradually relieved at any convenient time.

"Now disconnect by unscrewing the coupling and dispose of the steam in the vulcanizer by blowing off, or any other means preferred. Further remarks would seem unnecessary to a full understanding of the subject. Having used the gauge almost every day for about six months, I am fully satisfied that it is a decided improvement in vulcanizing, and am so delighted with it that no reasonable sum would induce me to substitute the thermometer.

"Before closing I may be permitted, in justice to the American Steam Gauge Co., of which Mr. H. K. Moore is Superintendent, to correct an error in my former communication, in locating their office at No. 44 Exchange, instead of No. 44 Congress Street, Boston."

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"Vital Chemistry.—At a late meeting of the Pharmaceutical Society of Edinburgh, DR. McADAM read a paper of much interest on the forces of nature, and the mode in which they apply to the phenomena of life. We give an extract, which, though long, will well repay for the reading. He says:—

"Heat is a most important force in relation to vital phenomena. The higher animals are much influenced by sudden elevations or depressions in temperature. Birds which have an average warmth of 110° Fahr., when reduced to about 80° Fahr. succumb to the effects of the cold, and man and other mammalia which have a temperature ranging from 98° to 102° , cannot generally be reduced below 70° Fahr. without fatal consequences ensuing. The majority of the higher animals can conform to circumstances of external heat and cold, and by the development of more or less internal heat counterbalance, to some extent at least, for the external variations in temperature. But where the supply of combustible matter within the living structure is sparing in quantity, and starvation ensues, the internal source of heat day by day decreases in amount, and correspondingly the vital activity becomes less powerful, and dwindles away till the flame of life flickers and then dies out. Before the last stage has been reached, artificial heat from external sources may revive the vital activity for the time, but where the production of heat internally has almost failed, the vitality of the animal sinks and sinks till it is extinguished. There are some exceptions to the rule, that decrease in temperature for 30° below the normal heat proves antagonistic to the sustenance of vitality. Thus the polar bear and marmot, having laid up a store of fat or combustible matter, can pass into a hybernating state—a condition of torpor or sleep, and live for months in a state of dormant vitality, where the pulsations decrease from 150 to 15 per minute, or one-tenth of the whole, and the respirations, which number in active life 500, fall to 14 per hour; whilst the temperature of the body may be reduced to within 2° or 3° of the freezing point of water. These hybernating animals awake from their condition of dormant vitality when the temperature of the air rises, and renew their vigor, having only lost during their long sleep the store of fat which they formerly possessed. All animal functions proceed more or less quickly as the temperature is increased to a reasonable extent; and the stimulus which external heat imparts to animal vigor may be well illustrated in the Triton, or water newt, which when it loses a limb cannot restore it at low or winter temperature, but in summer weather, when the temperature ranges from 58° to 75° Fahr., the Triton proceeds to make a speedy restoration of the lost limb. Another illustration of the effect of external heat in giving a stimulus to vital activity is observed in the hatching of the eggs of birds as well as those of serpents, where at ordinary temperatures the vitality of the germ lies dormant, and is only stimulated to action by the continued influence of a higher temperature.

"Light also exerts its stimulating powers in vital activity. In the

vegetable kingdom the absence of light is denoted by a sickly growth and a blanched aspect, and by the want of that solidity of structure and healthiness of stem and root which the plant exhibits where favored by sunshine. The effect of light on the animal kingdom is not less decided. Tadpoles, when they are excluded from light, and whilst they may be supplied with abundance of proper food, and the water containing the air they require for respiration is a constant running stream, do not in the absence of light develop themselves further into frogs, but remain tadpoles, increasing in size no doubt, but still only tadpoles—in fact they become merely monster frog babies. During the hatching of the silkworm's eggs, the influence of light is decided, as, in the dark, few of the eggs are hatched as compared with the number brought out in good light. Even human beings are influenced by light. The inhabitants of cellars and dark caves have a tendency to deformity, and the lighter our rooms are, and the more we are exposed to light, then there is the less liability to deformity. In the hospitals in London and St. Petersburg, it has been observed that in the wards which are best lighted, and especially those which have a southern exposure, there are more recoveries of the sick, and these recoveries are more speedy than in the darker wards, including those having a northerly exposure.

"Electricity and magnetism likewise play an important relation in the animal kingdom. The electrical and magnetic changes in our atmosphere undoubtedly influence all organic structures, and much of the depression or elevation of animal spirits from day to day may be probably ascribed to such changes. The influence of electrical storms in souring milk, beer, soup, and other organic substances is well known, and it has been long observed that the passage of a lightning flash through the animal frame not only causes death, but renders the body more liable to putrefaction, and probably also leads to the coagulation of the albumen of the blood and other juices and liquids.

"The relation which subsists between the physical forces and the vital activity of the animal, is only partly observable when we confine our attention to heat, light, and electricity and other forces, as acting externally in the animal economy. It is only when these and similar forces are recognized to be present in the food or medicine which are partaken of internally, that a more full insight is gained into the dependence of vitality upon the physical forces. And even then comparatively little can be known or observed unless we carry along with us the important doctrines and conclusions derived from the study of the mode in which one force can pass into another.

"Modern scientific inquiry has done much to establish the two following points:—

"1st. That the food of the animal not only supplies material to build up the structure and replenish waste, but that it also yields force which can be stored up in the animal economy and used, as necessity may require, in the display of vital energy.

"And 2d. That all the physical forces—heat, light, electricity, motion, magnetism, and chemical affinity—are transmutable one into the other, and that they can directly and indirectly minister to the vital force of the animal.

"It will conduce to perspicuity in the study of this intricate and highly philosophical department of science if I refer first to the mutual convertibility of the physical forces, and thereafter observe the mode in which

these can operate to sustain the vital activity of the animal. And I may state at once that the views held by scientific men on these points at the present day are mainly due to the labors of Mayer and Helmholtz on the Continent, and of Faraday, Grove, Jones, Thomson, and Tyndall in this country.

"The forces which have specially been experimented upon so as to exhibit the transmutation of one force into the other, are motion, heat, electricity, light, magnetism, and chemical affinity. Motion becomes heat when we rub or clap our hands; when two pieces of wood are rubbed against each other, as practiced by uncivilized nations in order to procure fire; when the blacksmith strikes rapidly the rod of iron till it becomes sensibly red hot; when a nail is held to a grindstone in motion till the nail becomes unpleasantly warm, and when the badly greased axle of the railway carriage admits of sufficient friction being exerted between the axle and its bearings as to raise these to a red heat and set fire to the carriage. Motion becomes electricity when two pieces of white sugar, or two quartz pebbles, are struck together in a darkened room, and a luminous electrical glow is developed; when two clouds rub against each other in the atmosphere, giving rise to one form of the lightning or electrical flash, and when a glass rod or cylinder is subjected to the friction of silk, as in the ordinary frictional electrical machine. Motion can pass into light when the heat of friction is sufficiently high to appear as light.

"Heat becomes motion, as may be evidenced during the fusing of the metals when the motion of the particles is developed; by the passage of ice into water and subsequently into steam, when the molecular motion gives rise to much dilation, and by the expansion of the liquid in the thermometer, which is a measurer of the intensity of heat, by the motion of the particles of the fluid. Heat becomes electricity, as observed in the thermo-electric batteries, where the heating of two metals in contact with each other develops electricity. Heat becomes light when it impinges upon a solid body, as by the introduction of a piece of platinum or infusible fire-clay in the flame of hydrogen, when a brilliant light is developed from the heat of the burning gas. Heat becomes chemical action, as in our fires and gas jets, the combustibles in which will not burn till a lighted taper is applied, and the heat so brought in contact with them determines chemical affinity between the combustible and the oxygen of the air; and in the explosion of gunpowder by the application of a heated rod, when the heat determines a new chemical arrangement of the particles of the gunpowder.

"Electricity becomes motion when the lightning flash strikes a house and dislodges the stones. Electricity becomes heat when a powerful current is arrested in its course by its passage along a thin wire, or when the lightning flash sets fire to combustible substances. Electricity becomes light when it bridges over a short space between two charcoal points, and gives rise to the electric light. Electricity becomes magnetism when the force conveying the current is wound round a piece of soft iron, which is immediately converted into a powerful magnet.

"Light becomes chemical action, as in the photographic processes, where it develops a change in the chemical nature of the substances on the photographic plate; and in the formation and fading of natural and artificial colors. The sun's heat and light, lying dormant in the coal and wood, become chemical action during the combustion, which then develops itself as heat and light once again.

"Magnetism becomes motion when a magnet draws or moves toward itself the iron keeper or nails which are placed in its vicinity, and the development of motion from magnetism is most clearly evidenced in the electro-magnetic machines which revolve with greater or less rapidity. Magnetism is converted into electricity in the magneto-electric machines which are now so largely employed for electro-plating and electro-gilding, and for telegraphic communication.

"Chemical affinity becomes motion during the combination and decomposition of substances when there is a molecular rearrangement of the atoms. Chemical affinity develops itself as heat in the operations which occur in our ordinary fire-places, where the chemical union of the oxygen of the air with the coal gives rise to heat. Chemical affinity passing into electricity occurs in every kind of galvanic battery where the chemical action of the acid liquid upon the zinc plates develops a sensible amount of electricity. Chemical affinity becomes light, as evidenced in the burning of every candle and gas jet, where the oxygen of the air enters into chemical union with the oil or gas, and yields light.

"The foregoing illustration of the correlation of the physical forces will suffice to show that one form of force can pass into and become another form of force; and that as there is no loss of matter on the surface of the earth, there is likewise no loss or annihilation of force. The sun, which is not only the centre and mainspring of our planetary sphere, but is also the great reservoir of force for the planetary orbs, is unceasingly throwing out force, and as unceasingly absorbing force from planetary space. The heat thrown off from the surface of the sun is equal to what would be evolved by the combustion of three-fifths of a ton of coal on each square foot of surface during each hour, and the temperature is as much higher than our artificial sources as the light of the sun is above all artificial sources of illumination. The heat evolved by the sun is so great, that a cylinder of ice forty miles in diameter driven with the velocity of light, viz., 192,000 miles in a second, would be liquefied before it reached the sun; and during every minute the sun radiates forth heat sufficient to boil 12,000,000,000 of cubic miles of ice-cold water. The proportion of the heat of the sun which falls upon the earth is less than a 2,000,000,000th of the whole heat-force evolved from that great caloric luminary, but this moiety is sufficient for the mighty physical changes which occur in this comparatively pigmy world, but to us a great globe. The sun's heat and light are absorbed by every plant, and become stored up in the wood and food supplied by the vegetable kingdom, so that when the wood is burned in our fire-places, the heat and light of the sun are evolved for economic purposes; and when the food is partaken of by the animal, and the elements are burned within the animal frame, the sun force develops the animal warmth, and becomes the motive agent which enables man and the other animals to perform their allotted tasks. The coal is fossil-wood with its store of solar force absorbed many ages ago, and the fat and muscle of the animal are aggregations of atoms held together by solar force, and suitable for future use. The sun not only guides our planet in space, but it raises water in vapor from the ground and surface of the sea, and rains it down on upland districts, giving rise to streams, and supplying the running force which moves the water-wheel of the factory. The sun, too, causes the motion among the particles of the air which gives rise to local and trade winds which move our vessels from shore to shore, and drive our windmills; and influencing the waters

of the ocean, the sun gives rise to the water-currents so well instanced in the Gulf Stream, and to the tides directly and indirectly through the moon. The solar orb directs the magnetic and electrical storms which more or less influence the earth at all times, and which, probably in an intense degree, as developed within the crust of the globe, give rise to earthquake action and volcanoes. In short, the sun is the all-motive agency in the physical world.

"We are now in a position to understand the remaining proposition, viz., that the food of the animal not only supplies material to build up the living structure and to replenish waste, but that it also yields force which can be stored up in the animal economy, and used, as necessity may require, in the display of vital energy.

"The physico-chemical conditions which minister as stimulants, have been stated to be both external and internal, and the latter are supplied directly or indirectly by plants. During its growth, the plant has built up in its structure not only matter, but force in the form of chemical affinity, and when the plant is partaken of as food by the animal, the matter and the force become available to the animal. Certain of the plant elements go to form fatty tissue, which can be stored in the animal frame and form a reservoir of fuel which can be burned at a future time; and part is used directly as fuel, so that by its combustion the animal warmth may be sustained. Certain of the other compounds of plant matter are elaborated by the animal into muscular and nervous tissue, and are stored up as force matter in the animal frame, whilst in other parts they rapidly undergo changes, and by their disintegration they yield the force exerted by the animal.

"These functions which the food of the animal fulfills, are very much the counterpart of the processes which occur in an ordinary steam-engine. A stock of coal is used in the fire-place, which by its combustion supplies the requisite warmth, and a supply of water is raised into steam, and gives rise to motive power; so in the animal economy, the elements of food which can form fatty tissue are burned in the animal structure so as to supply animal warmth, and the compounds which form nervous and muscular tissue are destroyed so as to yield force which is displayed as vital activity. Certain of the food compounds undergo change in the blood, and there yield heat and force, whilst others are stored up as fatty, nervous, and muscular tissue. In the building up or construction of those parts, heat and force are expended which can only be obtained by the destruction of another portion, which may, however, be more or less supplemented by external heat.

"The animal system is in a state of incessant motion, and therefore there must be incessant change. The destruction of the animal tissue during the display of the nervous and muscular functions, gives rise to the development of force in two ways: first, in the passage of matter from the living to the dead state, when the force exerted by the plant and the animal in the production of organized tissue is evolved; and second, in the disintegration and separation of the compound atoms of muscle from each other, and the resolution of those compound atoms into more simple substances.

"The motive force, therefore, which is exhibited by the animal is obtained by the destruction of muscular and nervous tissue, and the breaking up of similar compounds which are flowing in the blood. Labor, which requires the strength of the arm, and thought, which is the work

of the brain, alike necessitate the destruction of tissue and the evolution of force.

"The strict connection between the destruction of fatty and muscular tissue, and the amount of work done—which is the vital activity displayed by the animal—has received ample confirmation by the researches of Dr. Edward Smith. When the human body is in a quiescent state, but not sleeping, the amount of carbon and hydrogen burned during one hour evolves heat sufficient to raise the body or a similar weight of water $2\frac{1}{2}^{\circ}$ Fahr., and one-half of this quantity is only produced when the body is asleep. During hard work, as in ascending a hill at the rate of 1712 feet per hour, or in working a treadmill, there are five times as much carbonic acid evolved, indicating that a fivefold destruction of matter has been occurring in the animal economy. Of this increased amount, it is known that one-fifth is alone required to be expended in the mechanical work of raising the body to the height of 1712 feet in the hour, so that four-fifths of the whole heat evolved during the hour have escaped as heat, and hence the cause of the perspiration which generally accompanies mountain rambles. There is apparently, therefore, in the animal economy a loss of power in the form of heat, but in reality the available motive power is greater than what can be obtained from the best constructed thermodynamic engine, where only one-eighth of the force produced from the combustion of the carbon and the hydrogen is obtained as motive power, and the remaining seven-eighths are lost in the form of heat. The animal body is therefore a more complete motor machine than the steam-engine, and it illustrates to us even more forcibly than an ordinary machine can do, that whilst there is a circulation in force, there is also a conservation of force, and that there is no annihilation of power. The forces of heat and light which the sun supplied to the plant during its growth, and which the plant stored up in the chemical compounds it elaborated, have been handed over to the animal when the plant was partaken of as food, and the animal in its turn has disposed of them as heat and motor force, so that what the plant abstracted from nature has been restored by the animal to nature; and this statement applies equally to force and to matter."—(*American Druggists' Circular*.)

"*Transitions of Matter*.—From a discourse recently delivered before the New York Academy of Medicine, by that eminent scientist Dr. JOHN W. DRAPER, we make the following interesting and suggestive extract:—

"No one can devote himself to the study of physical science, and especially of chemistry, without experiencing at once what might seem to be contradictory sentiments—pride and self-humiliation. Pride, that he has been permitted to see so far as he does into the great scheme of the universe; humiliation, in recognizing how frail and insignificant he is.

"What, then, are some of the latest truths that these physical senses teach? They show us how transitory, how dependent we are. There is a constant wear and tear of the human system. Particles that served the purpose of forming it accomplish their office and die, and are replaced in due succession by others. In this respect life is the result of an aggregate of deaths. The atmospheric air into which all this dismissed material eventually finds its way, is thus the cemetery of animal substance, of things that have once been organized, but that have lost their force, and lapsed into an inorganic, a lifeless state. From this inorganic, this lifeless state, such substances are destined to be recalled; for, under the

influence of the rays of the sun, carbonic acid and water and ammonia are decomposed, and taking the products that arise from that operation, plants group them into organized portions again, and use them in the construction of their various parts, leaves, flowers, stems, fruits. Plants thus constitute the formative agents of the world of life. Animals are the destroyers. They organize, we consume; and thus it is that the same material oscillates back and forth, now a part of a plant, now a part of an animal, now in the air, and now in a plant again. It runs through cycle after cycle, ever returning to the point whence it set out, and ever setting out again.

“We are not, then, the special or exclusive proprietors of the substance of which we are composed. Equally may the plant, and equally any animal, no matter how humble in the scale of life it may be, lay claim to it. We are bound to them, and they to us, by an indissoluble tie.

“If that is the lesson we derive from our best knowledge of the mutations that happen to the plastic material which the hand of nature fashions into so many beautiful forms, we are brought to the same conclusion by a consideration of the physical forces with which she invigorates it—the heat possessed by the different animal tribes, cold-blooded or hot, in their special degree, the chemical affinities and the electrical powers that preside over all the thousand combinations and decompositions perpetually occurring in the inmost recesses of the economy. ‘In a waterfall which maintains its place and appearance unchanged for many years, the constituent portions that have been precipitated headlong glide finally and forever away. For the transitory matter to exhibit a permanent form it is necessary that there should be a perpetual supply and also a perpetual removal. So long as the jutting ledge over which the waters rush, and the broken gulf below that receives them remain unchanged, the cataract presents the same appearance. But variations in them mould it into a new shape. Its color changes with a clear or cloudy sky. The rainbow seen in its spray disappears when the beams of the sun are withdrawn. So in that collection of substance which constitutes an animal, whatever may be its position, high or low, in the realm of life, there is a perpetual introduction of new material and a perpetual departure of the old. It is a form rather than an individual that we see. Its permanence depends altogether on the permanence of the external conditions. If they change it also changes, and a new form is the result.’

“An animal is, therefore, a form, through which material substance is visibly passing, and suffering transmutation into new products. In that act of transmutation force is disengaged. That which we call its life is the display of the manner in which the force thus disengaged is expended.

“A scientific examination of animal life must include two primary facts. It must consider whence and in what manner the stream of material substance has been derived, in what manner, and whither it passes away, and since force cannot be created from nothing, and is in its very nature indestructible, it must determine from what source that which is displayed by animals has been obtained, in what manner it is employed, and what disposal is made of it eventually. The force thus expended is originally derived from the sun. Plants are the intermedium for its conveyance. For the sake of obtaining it we use them as food. And here again remarks apply similar to those we have made respecting material substance. The correlation and conservation of force holds good. The assertion of the great Spanish Mohammedan, Overroes, is confirmed by

all modern science, that the sum total of force in the world is ever the same, though it is parted among myriads of individuals, who draw from a common fountain their requisite supplies.

"The body that we have to-day is not the body we had yesterday ; we shall change it again before to-morrow. In the course of a year a man requires a ton and a half of material—that is, nearly twenty times his own weight—to repair his wasting organs, and to discharge his vital functions. In that short space of time the human family alone casts into the atmosphere 1,800,000,000 of tons, and we are but a little fraction of the vast aggregate of animal life which all in its proper proportion is doing the same thing.

"From nature, which at this point of view presents us such an enchanting picture, let us turn to ourselves. Physiology rivals natural philosophy in the splendor and profound interest of its discoveries. We tremble on the brink of detecting the interior constitution of man. Will you hear me patiently while I give an example of what I mean ? No event has ever taken place in the world without spontaneously leaving a recoverable impression of itself. The hand that wrote those words has cast its shadow on the paper. A century hence, if the paper should endure, that shadow might be made visible to the eye. But moralists say, 'What is more transitory than a shadow ?' They find in it an emblem of things of a fleeting nature. When the light, or the object that has obstructed it, is withdrawn, the shadow 'fleeth away and continueth not.' A sundial, that has been telling the hours of the day, presents an unblemished surface when evening comes. Each morning it is ready for its task. The traces of the past seem all to have disappeared, but in truth they still exist, buried in the marble or the metal out of which the dial is made.

"They who have visited the dark rooms of photographers know very well what I mean. The portraits of our friends, or landscape views, may be hidden, and invisible to the eye, but ready to make their appearance as soon as proper means are resorted to, such as heat, or vapor of mercury, or sulphate of iron, or pyrogallie acid. Shadows are not such transitory things as men commonly suppose. In the case of photography, we happen to know the proper means for development. The fact of chief interest to us is the imperishability of the primitive impression. A spectre is concealed on a silver or glassy surface until, by our necromancy, we make it come forth to the visible world. Upon the walls of our private apartments, where we think that the eye of intrusion is altogether shut out, and our retirement can never be profaned, there exist the vestiges of all our acts, silent but speaking silhouettes of whatever we have done. Can we say that among those phantoms there are not some on which we should be reluctant to have the cunning chemist try his art, and leave them, as the photographers say, fixed : some from which we should dread to hear the demand of the phantom of Endor, 'Why hast thou disquieted me to bring me up ?'

"If men were sure that their most secret doings were at such a risk, would not the world be better than it is ? A sunbeam or a shadow cannot fall upon a surface, no matter of what material that surface is composed, without leaving upon it an indelible impression, and an impression which may, by subsequent application of proper chemical agents, be made visible. In many cases we have ascertained what the appropriate agent is, our failure in others is due to the imperfection of our knowledge, and not to any impossibility in the operation. Time seems to have so little

influence on these effects, that I can conceive it possible, if a new vault should hereafter be opened in the midst of an Egyptian pyramid, for us to conjure up the swarthy forms of the Pharaonic officials who were its last visitors, though forty centuries may have elapsed since their departure.

"But let us see how these facts bear, in a most important manner, in the case of man.

"If after the eyelids have been closed for some time, as when we first awake in the morning, we suddenly and steadfastly gaze at a brightly illuminated object, and then quickly close the lids again, a phantom image is perceived in the infinite darkness before us. We may satisfy ourselves that this is not a fiction of the imagination, but a reality; for many details that we had not time to examine in the momentary glance, may be contemplated at our leisure in the phantom. We may thus make out the pattern of such an object as a lace curtain hanging in the window, or the branches of a tree beyond. By degrees the image becomes less and less distinct, in a minute or two it has disappeared. It seems to have a tendency to float away in the vacancy before us. If you attempt to follow it, by moving the eyeball, it suddenly vanishes.

"Now the condition that regulates the vanishing phantom-images on the retina is, that when they have declined in vigor to less than $\frac{1}{64}$ of the intensity they had while in the presence of the object that formed them, they cease to disturb the sight. This principle is illustrated when a candle-flame is held opposite to the sun, or any light having more than sixty-four times its own brilliancy. It then ceases to be visible. The most exact of all known methods for measuring light—that by the extinction of shadows—is an application of the same principle.

"But the great fact that concerns us is this: Such a duration of impressions on the retina of the eye demonstrates that the effect of external influences on nerve vesicles is not necessarily transitory. It may continue for a long time. In this there is a correspondence to the duration, the emergence, the extinction of impressions on photographic preparations. Thus I have seen landscapes and architectural views taken in Mexico, 'developed,'—as artists say—months subsequently; the images coming out, after the long voyage, in all their proper forms, and in all their contrast of light and shade. The photograph had forgotten nothing. It had equally preserved the contour of the everlasting mountains, and the passing smoke of a bandit fire.

"Are there then contained in the brain more permanently, as in the retina more transiently, the vestiges of impressions that have been gathered by the sensory organs? Do these constitute the basis of memory—the mind contemplating such pictures of past things and events as have been committed to her custody? In her silent galleries are there hung micographs of the living and the dead, of scenes that we have visited, of incidents in which we have borne a part? Are these abiding impressions mere signal-marks, like the letters of a book, which impart ideas to the mind, or are they actual picture-images, inconceivably smaller than those made for us by artists, in which, by the aid of a microscope, we can see, in a space not bigger than a pin-hole, a whole family group at a glance?

"The phantom images of the retina, as I have remarked, are not perceptible in the light of day. Those that exist in the sensorium, in like manner, do not attract our attention so long as the sensory organs are in vigorous operation, and occupied with bringing new impressions in. But

when these organs become weary and dull, or when we experience hours of great anxiety, or are in twilight reveries, or asleep, the latent apparitions have their vividness increased by the contrast, and obtrude themselves on the mind. For the same reason they occupy us in the delirium of fevers, and doubtless also in the solemn moments of death. During a third part of our lives we are withdrawn from external influences—hearing and sight, and the other senses are inactive; but the never-sleeping mind—that pensive, that veiled enchantress, in her mysterious retirement looks over the ambrotypes she has collected—ambrotypes, for they are unfading impressions—and combining them together as they chance to occur, weaves from them a web of dreams. Nature has thus introduced into our very organization a means of imparting to us suggestions on some of the most profound topics with which we can be concerned. It operates equally on the savage and on the civilized man, furnishing to both conceptions of a world in which all is unsubstantial. It marvelously extracts from the vestiges of the impressions of the past overwhelming proofs of the reality of the future, and gathering its power from what might seem a most unlikely source, it insensibly leads us—no matter who or where we may be—to a profound belief in the immortal and imperishable, from phantoms that have scarcely made their appearance before they are ready to vanish away!”—(*Annual of Scientific Discovery.*)

“*Universal Metamorphosis.*—If a wafer be laid on a surface of polished metal, which is then breathed upon, and if, when the moisture of the breath has evaporated, the wafer be shaken off, we shall find that the whole polished surface is not as it was before, although our senses can detect no difference; for if we breathe again upon it the surface will be moist everywhere except on the spot previously sheltered by the wafer, which will now appear as a spectral image on the surface. Again and again we breathe, and the moisture evaporates, but still the spectral wafer reappears. This experiment succeeds after a lapse of many months, if the metal be carefully put aside where its surface cannot be disturbed. If a sheet of paper on which a key has been laid be exposed for some minutes to the sunshine, and then instantaneously viewed in the dark, the key being removed, a fading spectre of the key will be visible. Let this paper be put aside for many months where nothing can disturb it, and then in darkness be laid on a plate of hot metal—the spectre of the key will again appear. In the case of bodies more highly phosphorescent than paper, the spectres of many different objects which may have been laid on it in succession will, on warming, emerge in their proper order. This is equally true of our bodies and our minds. We are involved in the universal metamorphosis. Nothing leaves us wholly as it found us. Every man we meet, every book we read, every picture or landscape we see, every word or tone we hear, mingles with our being and modifies it. There are cases on record of ignorant women, in states of insanity, uttering Greek and Hebrew phrases, which in past years they have heard their masters utter, without, of course, comprehending them. These tones had long been forgotten; the traces were so faint that, under ordinary conditions, they were invisible; but these traces were there, and in the intense light of cerebral excitement they started into prominence, just as the spectre image of the key started into sight on the application of heat. It is thus with all the influences to which we are subjected.”—(*Cornhill Magazine and Ibid.*)

"Influence of Mental Impressions as a Cause of Bodily Deformity.

—DR. MEADOWS read to the Obstetrical Society of London the particulars of a case of monstrosity. Having first expressed his conviction in favor of the proposition that the mind can and does act in this way, he reviewed and combated the various objections urged against it; the principal one being the absence of any direct connection between the nervous system of the mother and that of the fœtus through the umbilical cord. He, however, endeavored to prove—or rather suggested the possibility, as it was not a matter admitting of any distinct proof—that mind, or the mental force, was not and could not be thus bound down, as it were, by the anatomical limits of the nervous structures; that it must have a power of action, if it has any action at all, throughout the entire organism, and in every part of it, whether it possessed nerves or not: in other words, that its sphere of action was only limited by the configuration of the body. Hence it was inferred that in those tissues where the existence of nervous elements could not be demonstrated, the mental or nerve force might, as it were, pass across the intervening matter between any two parts where nerves did exist, just as electricity traversed space between any two conductors. The author then applied this reasoning to the case of the fœtus in utero, and offered an explanation of the mode by which mind thus acts upon matter by supposing a kind of correlation between mental and nerve force analogous to the correlation of other physico-vital forces; the nerve force being here the active agent in those nutritive processes upon the changes of which deformities depend."—(*Lancet*.)

Influence of Maternal Mental Impressions on Fœtus.—"The following communication, which appeared in the *London Journal of Photography*, Oct. 28, 1864, is vouched for by the Editor as entirely reliable: 'Some time since my wife was engaged preparing albumen paper in the silver-bath, and in a moment of abstraction pressed two of her fingers on her forehead, being at the time about to add another "olive branch" to the family. Soon after the birth of the baby, we were surprised and annoyed at noticing that the child, when in a strong light, exhibited two distinct impressions similar to silver stains before fixing; and the strangest part of the matter is that these disappear as night comes on and reappear as daylight arrives.

"These stains, although at present serving as a sort of actinometer to me, will prove a sad disfigurement to my daughter's appearance in daylight, and we much regret they were not impressed in some less conspicuous place.'"—(*Annual of Sci. Disc.*)

"Fixity of the Types of Man.—At the last meeting of the British Association, Rev. T. FARRAR, in a paper on the above subject, maintained that, as far as we can go back, the races of man under all zones appear to have maintained an unalterable fixity. On the oldest Egyptian monuments we find Jews, Arabs, Negroes, Egyptians, Assyrians, and Europeans depicted with a fidelity as to color and feature hardly to be surpassed by a modern artist. It might be objected, that this fixity was due to the surrounding conditions having remained unaltered. But a glance at the map shows this objection to be invalid; for the eastern region of Asia, from 70° N. lat. to the equator, offers every variety of temperature, yet is peopled by a single type, the Mongolian. By the side of the fair Circassian we find brown Calmucks; short, dark Lapps live side by side

with tall, fair Finns. The color of the American Indian depends very little on geographical positions. In short, color is distributed over the globe in *patches, not in zones*. Europeans transplanted from the temperate to the torrid zone do not, even in the course of generations, undergo very considerable modification of type. This may be seen in the Dutch, who have lived in South Africa for 310 years, and in the descendants of the Spanish and Portuguese in South America; also in the Negroes transplanted to America. Independently of this, we find races widely differing from each other, but dwelling side by side, who, so far as we know, have, from time immemorial, been affected by the same climate; such is the case with the Bosjesmen and the Kaffirs, the Fuegians and the Patagonians, the Parsees and the Hindoos. This fixity of type applies to habits as well as to corporeal features. The life of the Ishmaelite of to-day might be described in the identical terms applied to his first ancestor; and the Mongol has the same habits as in the days of Æschylus and Herodotus, or, perhaps, thousands of years before. It may be objected that a period of a few centuries is little or nothing in ethnological matters. It is, at any rate, everything to those who, without miraculous interference, of which nothing is recorded, have not more than that period between the Deluge and the date of the oldest Egyptian monument in which to account for the appearance of, for instance, the full grown, well-marked Nigritian type. It remains for every one who is convinced of these facts to draw from them such inferences as appear to him most truthful and logical.

"In the discussion which followed, Mr. Russell stated that he believed that the fixity of the type of races during the historical period was only one of the numerous proofs of the great antiquity of man. The results of various branches of inquiry—geological, traditional and ethnological—all pointed one way. He maintained that some amount of modification was known to have taken place in the descendants of one and the same race—the European and Indian branches of the Aryan race, for example; he therefore concluded that, as two lines not exactly parallel will eventually meet if traced out, so the various races and sections of races of man must be concluded, from this known example of divergence, to have had a common origin, however remote in time that origin may have been."—(*Ibid.*)

Elimination of Medicinal Agents from the Body.—"MM. BERGERON and LEMAITRE have lately made some observations on the elimination of medical substances with the sweat. (*Arch. Génér.*) The patients were placed in a dry chamber, where the temperature could be raised to 60° and 65° cent. The sweat was then allowed to drain off; and as much as from forty to sixty *grammes* could be collected in this way. They found that the arsenites of potass and soda were eliminated as such. The arsenite of iron was decomposed, the iron passing away with the urine, and the arsenic as an alkaline with the sweat. The protiodide of mercury was eliminated as a bichloride; traces of mercury were found in the sweat; and the iodine was discovered in the saliva and the urine. Bichloride of mercury was also found in the sweat and in the urine. Iodide of potassium was found in the saliva and the urine, but not in the sweat. In two cases of albuminuria, albumen was not found in the sweat. A small quantity of sweat, collected from a diabetic patient, contained a large quantity of sugar."—(*British Med. Journ.*)

"Odontological Society.—The monthly meeting of this Society was held on Monday, May 1, Thomas A. Rogers, Esq., President, in the chair. The Secretary brought forward a model taken in the practice of Mr. Walkinshaw, representing a case of torsion, in which the lateral incisor on the left side was turned half round. On turning the tooth round by means of the forceps it was found to be of an oval shape transversely, so that it projected considerably beyond the natural arch. Some discussion ensued as to the use of the forceps for turning teeth, Mr. Tomes and Mr. Catlin stating that they had frequently performed the operation with complete success. Models were also brought forward by Mr. Williams, representing cases of double cleft palate with double hare-lip, taken from children at the age of four, seven, and seventeen days. Mr. H. Rogers said he had been making experiments with a view to improve the quality of solders for the mouth. He tried several metals, but ultimately preferred cadmium, making the solder in the proportion of a grain and a quarter of cadmium to a pennyweight of gold. That solder flowed easily, held well, and came a good color out of hydrochloric acid."—(*Med. Times and Gaz.*)

"Sorel's Cement for Stopping Teeth.—The author prepares a light oxide of zinc by moistening the ordinary oxide with nitric acid, and then igniting it. Oxide so prepared he makes into a soft paste with a solution of chloride of zinc having a specific gravity 1.9 or 2.0. The soft mass in a few minutes acquires great hardness, which it preserves for many years. To imitate the color of the teeth the mixture may be made gray with the least trace of carbon; it is sufficient to hold the pestle with which the mixture is made over the gas for a moment. If a yellow tint is required, a trace of sulphide of cadmium may be employed."—(*Neues Repertorium and Chem. News.*)

Papier-Mâché in the Industrial Arts.—The *American Artisan* states that at a recent meeting of the French "Society of Civil Engineers, Mons. Clémandot read a notice of a new branch of industry, 'Stiffened Pasteboard and its Industrial Applications.' He touched upon the common use of pasteboard for fancy articles, in which shape it is known as *papier-mâché*, but up to the present time the substance had not been applied to industrial objects, and it is for such a purpose that works have been founded at Clichy, by the firm of Dufournet & Co. Their first application has been the form of sugar-moulds, for refineries. This is an important sort of utensil, and represents considerable sums of purchase and maintenance, being indispensable for the completion of the process of refining. Enumerating the different moulds hitherto employed, of clay, sheet-iron, zinc, plated copper, and glass, M. Clémandot rapidly passed in survey the various disadvantages of all. The best of these are the sheet-iron moulds, painted or enameled, but they have an immense drawback. In a short time the paint or enamel cracks off from the iron, and at these bare places the metal deposits on the sugar-cone spots of rust, the sugar sinks in value, and the mould must be repaired. Thus a double loss is involved. The pasteboard moulds are evidently free from this inconvenience, as it is quite impossible they should stain the cones, and they need no repairs on account of the fixity of the paint or lacquer on the pasteboard, their lightness renders them easy to handle. But to attain these excellent qualities the manufacture of the moulds must be very

careful, the properties of the paper must be entirely changed, and it must be made impermeable. A sheet of pasteboard, cut into the suitable shape, is submitted to the action of a hydraulic press, which rolls it into the desired form. It is then covered with coats of paint and lacquer, which insure its impermeability and smoothness; and in the double process the pasteboard becomes hard and firm enough to withstand all the blows of the after processes. A cap of sheet-iron at the top and an iron ring round the base complete the strength of the mould. The price of the materials, the risk of burns at a temperature of about 120° , and the number of hands employed, render this a very delicate manufacture, and justify the high prices of the moulds. M. Clémandot next exhibited the economical grounds on which these moulds have a certain prospect of success. According to the estimate of clever refiners a mould of sheet-iron costs 1*l*. 50*c*. per annum, allowing for the repairs of the mould itself and for the loss upon the stained sugar. The moulds of hardened pasteboard have, after six years of use, cost nothing more than cost price, 5*s*. 50*c*., while the metal moulds have cost 9*l*. over and above cost price, being a total of 14*l*.; the difference 8*l*. 50*c*. For 100,000 moulds then, the six years economy would be 850,000*f*., and the paper moulds are still in good condition, so that the extent of the economy for future years cannot be foreseen. With due care in the use they may still last numbers of years.

"Dufournet & Co. have undertaken, in addition to this sugar-mould manufacture, other secondary branches, which possess a certain interest. Their stiff pasteboard being light, not fragile, not subject to change, and resisting perfectly a large number of chemical agents, replaces, with saving and further advantages, porcelain, glass, and gutta-percha. The manufacture has also been applied to basins and funnels for photography. These basins are likely to render great service to photography, especially in traveling. When for this use they are filled in with other appliances, which, in small compass, and with a trifling weight, form all the baggage needful. Dufournet & Co. have also studied the manufacture of cells for electric piles. M. Clémandot hoped that these non-friable cells would soon find their natural place on trains carrying the electric battery. One of them has now been used for nearly a year at the station of Noisy-le-sec.

"M. Clémandot concluded by saying he was assured this new branch of industry was destined to play its part in the numerous adaptations of which it is susceptible, and the first efforts of which so far give good reason for large conjecture."

"*Microscope Lamp*.—MR. JOHN BOCKETT sends us a photograph of his method of mounting and using a microscope lamp. A pillar upon a foot carries a glass lamp with a reflector behind it, and a condensing lens in front. The reflector is about three and a half inches in diameter, and the bull's-eye condenser about two inches in diameter, and placed a little within the focus of the reflector. A shade is also provided. We have long used and recommended the addition of a silvered reflector behind a lamp. It not only economizes light, but for many purposes improves its quality, as objects may be illuminated almost entirely by the reflected light when the wick is turned low, and thus the glare of the direct flame is avoided. Mr. Bockett burns Belmontine, which gives a whiter light than paraffine."—(*Intellectual Observer*.)

Conduction of Heat.—In relation to Tyndall's researches, M. L'ABBE LABORDE states that he heated to redness one end of a thin iron bar so long that the other end could be held without burning. When the red end was plunged into water the other end became so hot he was compelled to drop it. The rapid compression of the hot metal, he says, is no doubt the cause of the elevation of temperature; but he asks if another cause may not be suspected: for instance, the creation of thermo-electric currents."—(*Ann. of Sci. Discovery.*)

Water boiled in Paper Vessels.—MR. TERRIL has laid before the Chemical Society of Paris facts proving that the paper on which a layer of water is placed, may be heated to the highest temperature without being changed. He states, that the non-conductibility of the paper for heat, and the constant evaporation of the liquid through the pores of the paper, prevent the combustion of the paper and the ebullition of the water when heated in vessels of paper. During the experiment, there is endosmosis of the exterior gases through the pores of the paper, and hence, when the water contains metallic salts in solution, these are reduced by contact with the flame, after having traversed the paper."—(*Ibid.*)

Passivity of Metals.—"The so-called passive state of metals has been proved, by Dr. Heldt, to result from the formation of an insoluble film differing in different cases, but always protecting the metal from the attack of the acid or other solvent."—(*Les Mondes and Franklin Inst. Journ.*)

Action of the Metalloids on Glass, and on the Presence of Alkaline Sulphates in all Commercial Glass.—M. PELOUZE read a memoir on this subject to the Academy of Sciences. Carbon, sulphur, silicium, boron,—all would appear to give a yellow color to glass. Hydrogen also, when passed over the glass in fusion, seems to cause a yellow coloration. How does this happen? All ordinary glass, says M. Pelouze, contains sulphates, and the coloration is due to their reduction, sulphur in every case being the efficient cause of the color; for glass perfectly free from sulphates remains uncolored with the before-mentioned metalloids; and the same glass is colored directly by sulphur, and alkaline or earthy sulphides."—(*Chem. News.*)

Oxidizing Properties of an Admixture of Nitric and Sulphuric Acid.—"M. DEITZENBACHER, in a note to the same, On some Properties of Nitric Acid, gave an account of some of the effects produced by a mixture of mono-hydrated nitric acid and Nordhausen sulphuric acid. Such a mixture in the cold instantly oxidizes roll sulphur, sets fire to charcoal, soot, and phosphorus, ordinary or red, converts in a few minutes arsenic into arsenious acid—is, in fact, one of the most energetic of oxidizing agents. On boiling such a mixture in a retort, oxygen is abundantly given off. The mixture, however, in the cold has no action on some of the most oxidizable metals."—(*Ibid.*)

Quicksilver Purification.—"There are a few things which cause more trouble in saving gold than the impurities which often exist in the quicksilver used for amalgamating. These impurities often consist of lead, sometimes of some greasy substance, and often of copper and other metals held in metallic or mineral form. To separate these impurities from the

quicksilver has, by many, been found a difficult matter. We are assured that the cleaning or separating may be readily accomplished by retorting, but in doing so the mercury in the retort should be covered an inch deep with pulverized charcoal, which at once absorbs all the impurities, and leaves the mercury clean. This method is extensively practiced in some of our mining countries, and is said never to fail in its results. We recommend it to our miners."—(*Colorado Miners' Journal and Sci. Amer.*)

"*Welding Steel and Cast or Malleable Iron.*—MR. WM. CARSON COR-SAN, of Sheffield, has provisionally specified the use of a composition, consisting of borax, 50 parts; Calais sand, 30 parts; emery, 10 parts; and manganese, 10 parts, in the welding of steel and cast or malleable iron; but he does not restrict himself to these precise proportions."—(*Ibid.*)

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The Renewal of Life; Lectures chiefly Clinical. By THOMAS KING CHAMBERS, M.D., Honorary Physician to His Royal Highness, the Prince of Wales; Physician to St. Mary's and the Lock Hospital. From the third London edition. Philadelphia: Lindsay & Blakiston, 1865.

This is a reprint of a popular English work, consisting of a series of lectures on the general laws of life and death, health and disease, with those of hygiene and therapeutics in their immediate relations to practical medicine, in conjunction with clinical discourses on various special disorders. While exceptions might justly be taken to some of the doctrines in this book, yet in the main, it is a very able and scholarly production, which may be studied with both pleasure and profit, the subject-matter being generally treated in such a lucid, logical, original, and sprightly manner as to enchain the attention while appealing to the judgment. The high scientific character and practical value of this meritorious publication may be directly estimated by the instructive observations "on the formation of mucus and pus," reprinted in the last volume of the DENTAL COSMOS, on their first appearance in the pages of an English medical periodical. The paper, typography, and binding are superior, and in keeping with the standard character of the work.

Physicians' Prescription Book: Containing lists of the terms, phrases, contractions, and abbreviations, used in prescriptions, with explanatory notes; the grammatical construction of prescriptions; rules for the pronunciation of pharmaceutical terms; a prosodical vocabulary of the names of drugs, etc.; and a series of abbreviated prescriptions, illustrating the use of the preceding terms. To which is added a key, containing the prescriptions in an unabbreviated form, with a literal translation. For the use of medical and pharmaceutical students. By JONATHAN PEREIRA, M.D., F.R.S. Fourteenth edition. Philadelphia: Lindsay & Blakiston, 1865.

The character and value of this little book is sufficiently indicated by its title and the number of editions through which it has passed, although it might be stated that in consequence of its being based upon the British Pharmacopœia, it is better adapted to the English than the American student of medicine. Its mechanical execution is good.

